RAILROAD GAZETTE

FRIDAY, JUNE 7, 1878.

## The Railway Car Accountants' Association.

The Committee on Publication, Mr. T. M. Luce, of the Chicago & Northwestern, and Mr. A. W. Briggs, of the Illinois Central, have issued the following abstract of the proceedings of the third annual meeting, which was held in New York, May 26 and 27 ·

Geo. W. Jones, of the Pennsylvania Railroad, was elected President; Geo. K. Cooke, of the Erie Railway, was elected Vice-President; F. M. Luce, of the Chicago & Northwestern Railway, Secretary; A. W. Briggs, of the Illinois Central Railroad, Assistant Secretary.

The following subjects were presented for discussion:

*First.*—What is the sense of the convention as to the best method of paying for car service?

*Second.*—The exchange of daily junction reports.

*Third.*—What is the best form of making daily junction reports?

*Fourth.*—The exchange of daily mileage and movement reports.

*Fifth.*—What is the best form of making daily mileage and movement reports?

*Sixth.*—Cannot the number of mileage reports made to line managers be reduced?

*Seventh.*—Cannot the number of initials and amount of lettering on cars be reduced?

*Eighth.*—Is it advisable to have the names of parties in direct charge of car records put in the *Official Railway Guide*?

*Ninth.*—As lines cannot reciprocate in the matter of making reports, should they not furnish the proper blanks, stationary, and postage stamps?

*Tenth.*—If a foreign car is destroyed or disabled, would it not be advisable to notify the car accountant of the road owning the car of the fact at once.

Mr. J. T. Rigney, of the Baltimore & Ohio Railroad, read an article favoring the plan of charging per diem for the use of cars as follows:

### MR. RIGNEY'S PAPER ON PAYMENT FOR CAR SERVICE.

The car service question is a vexed one. The use of cars has always been unsatisfactory, and will continue so to be as long as the present system of usage exists—under which neither protection nor penalty is afforded.

Mileage, as reported, is now the prevailing pay for use of cars in all cases. Under the present mode of usage, the custom of appropriating foreign cars to local service causes so many detentions that much mileage cannot be made, and the question arises, does it pay owners to permit their cars to go from home? If it does not pay, while business demands the interchange of cars a plan must be sought and used that will pay owners, and that will, at the same time, be true, and remove every doubt and suspicion from reports, and be a preventive of detention to cars.

Mileage allows nothing for idleness, though a car remains on a siding for months, and there being no remedy under the system, agents and consignees discharge cars at their pleasure, managers move them at their convenience, because they pay nothing for a month's idleness, but do for a day's run. Neither protection of penalty is given under the mileage system, both of which are certainly necessary.

If a car is damaged or destroyed on a foreign road, the road is responsible for its value, by repairs or payment. There is no good reason why detention should not have protection also. Where a car is destroyed on a foreign road, it is often left to the owner after lapse of a long time through search to learn of it. During the time between destruction and restoration, the owner does not receive one cent. The loss of time is entirely at his cost. Months may elapse before the matter is adjusted. Does any one doubt that prompt settlement would be made if a well defined obligation was in existence to compel it?

The remedy can only be through a per diem rental for cars. The constant movement of cars homeward would ensue. Every manager would keep foreign cars moving; all roads would be willing to let their cars go from home, because they would know that they would get paid for their absence, and they would get back at the earliest moment possible. By the per diem plan, every road will know every day its car service earnings, out of which it cannot be defrauded. Mileage clerks and reports can be dispensed with.

Mr. Rigney offered the following propositions:

1st. That a uniform and adequate pay for car service is necessary to a just compensation to owners of cars passing to other roads.

2d. That a rate per day for such service, is the most equitable.

3d. That the pay shall be for the entire absence of the cars.

A vote of thanks was tendered to Mr. Rigney for the address.

### RESOLUTIONS.

*Resolved*, That the members of this convention form into a permanent organization, which shall hereafter be known as "The Railway Car Accountants' Association," and that a committee be appointed, who shall prepare a constitution and by-laws, and have them ready to present at the next annual meeting.

*Resolved*, That since separating the line car mileage into separate accounts, according to the ownership of such cars, adds materially to the work of car accounting, and that since by reporting individual mileage of cars, the line managers have all necessary information, therefore, that it is the sense of this meeting that the line managers be requested to separate the mileage as they may see fit.

*Resolved*, That the publishers of the *Travelers' Official Railway Guide* be requested to add a column under their official list of officers in charge of car service accounts, the following, viz.: "Name of persons to whom car tracers should be sent."

*Resolved*, That the sense of this convention impels the conviction that the adoption of a proper system of demurrage would be highly advantageous to all roads desiring to make the most of their equipment. The object of this resolution is to call the *special attention* of *managers* to this subject, and to recommend that they authorize and instruct their representatives at the next meeting of this Association to vote for the payment of a demurrage of 50 cents per diem, or such other rate as they may deem a proper equivalent for the use of their cars, for each and every car that may be detained at any given point longer than one week, unless a good and sufficient reason can be given for such detention, in which case no demurrage shall be charged or paid.

*Resolved*, That when a foreign car is destroyed on any road, the car accountant of the road on which the car was destroyed shall notify by special report the car accountant of the road owning the car of such destruction.

*Resolved*, That the committee appointed to prepare topics for discussion for the next convention have two hundred copies of the same printed and sent to the representatives of the different roads thirty days prior to the time of the meeting of the convention.

The following resolution was offered:

That this convention indorse the "Junction Exchange Reports," and that as representatives of the several roads agree to commence the use of the same July 1, 1878, if possible, and that the representatives of all roads authorized to commence this report at the time specified furnish to the Secretary of the convention their names, with the names of the roads they represent.

To this the following amendment was offered and carried:

*Resolved*, That in connection with the "Junction Exchange Reports," it is the sense of this convention that the "Daily Individual Reports" present advantages and benefits superior to those of any other system heretofore in practice, and that it is to the interest of all roads to adopt and use it.

The vote stood as follows:

*In Favor of the Combined Report* 40 *Yeas.*

Atlantic & Great Western, Cleveland & Mahoning Valley—A. W. Davies, Car Accountant.
Louisville & Nashville, South & North Alabama, Glasgow Branch—H. T. Curd, Auditor.
Grand Rapids & Indiana, Cin., Richmond & Fort Wayne, Traverse City Branch—D. W. Mooar, Car Accountant.
Chicago, St. Louis & New Orleans, Mississippi & Tennessee, Vicksburg & Meriden—S. B. McConnico, Auditor.
Michigan Central, Detroit & Bay City—S. C. Annable, Car Accountant.
New York Central & Hud. R., New York & Harlem—D. W. Tuthill, Auditor.
Columbus & Hocking Valley, Columbus & Toledo—Geo. C. Mather, Car Accountant.
Lake Shore & Mich. Southern, Cleveland, Columbus, Cin. & Ind., Cincinnati & Springfield—Geo. H. Weeks, Car Accountant.
Union Tank Line—H. R. Payne, Car Accountant.
Red Line—F. B. Hannis, Car Accountant.
Green Line—R. C. Robinson, Car Accountant.
Canada Southern Line—W. H. Alport, Car Accountant.
Great Western Despatch—J. Farnsworth, Car Accountant.
Hoosac Tunnel Line—J. N. Fuller, Car Accountant.
Indianapolis, Bloom. & Western—E. P. Miller, Car Accountant.
Illinois Central—A. W. Briggs, Car Accountant.
Indianapolis, Peru & Chicago—C. H. Rockwell, Auditor.
Missouri Pacific—C. A. Fisk, Car Accountant.
Mineral Point—A. W. Cobb, Auditor.
St. Louis, Iron Mt. & Southern—M. Sweeney, Car Accountant.
Eastern—C. H. Palmer, Jr., Car Accountant.
Chicago, Burlington & Quincy—E. Matthews, Car Accountant.
Chicago & Alton—J. P. Moore, Car Accountant.
Erie—G. K. Cooke, Car Accountant.
European & North American—W. H. Harlow, Auditor.
Cincinnati, Sandusky & Cleveland—C. L. Williams, Car Accountant.
Petersburg, of Virginia—L. E. Clark, Auditor.
Buffalo, New York & Philadelphia—W. W. Haley, Car Accountant.

*Against the Combined Report* 27 *Nays.*

Baltimore & Ohio—J. T. Rigney, Car Accountant.
Pennsylvania—G. W. Jones, Car Accountant.
Boston & Albany—A. J. Chapin, Car Accountant.
Canada Southern Railway—R. Burns, Car Accountant.
Chicago, Rock Island & Pacific—G. E. Weir, Car Accountant.
Chicago & Northwestern, West Wisconsin—F. M. Luce, Car Accountant.
St. Louis, Vandalia & Terre Haute, Terre Haute & Indianapolis—H. G. Sleight, Car Accountant.
Grand Trunk—Jno. Hunt, Car Accountant.
Detroit, Lansing & Northern—J. F. Reekie, Car Accountant.
Cleveland & Pittsburgh—F. A. Saunders, Car Accountant.
Central Railroad of New Jersey—Sam'l Manning, Car Accountant.
United Railroads of New Jersey—D. W. Powell, Car Accountant.
Pittsburgh, Ft. Wayne & Chicago—W. J. Neison, Car Accountant.
Chicago & Eastern Illinois—Wm. Gibson, Car Accountant.
Northern Central—H. F. Woodward, Car Accountant.
Philadelphia & Erie—J. W. Bone, Car Accountant.
Pittsburgh, Cincinnati & St. Louis, Indianapolis & Vincennes—H. N. Eastman, Car Accountant.
Philadelphia & Reading, Reading & Columbia—A. J. Speese, Car Accountant.
Baltimore & Potomac, Alexandria & Fredericksburg—J. A. Wilson, Car Accountant.
Alleghany Valley, Pittsburgh, Titusville & Buffalo, Buffalo, Corry & Pittsburgh—J. W. Reinhart, Car Accountant.
C. P. Chesebro, Car Accountant, Wabash Railway, declined to vote.

Mr. McConnico made an explanation in regard to the resolution and amendment with reference to "Junction and Individual Reports." He stated that after consultation with a number of the members voting in favor of individual mileage, he had ascertained that it was their intention to send the combined junction and individual reports to all roads, including those who only reciprocated by the junction reports.

### RESOLUTIONS.

*Resolved*, That a committee of three be appointed to agree upon a uniform blank to be used in making the "Individual Mileage" and "Junction Exchange Reports," and that line companies be requested to furnish blanks and envelopes of the regulation form to all roads using their cars.

*Resolved*, That a vote of thanks be extended to the proprietors of the Fifth Avenue Hotel for the many courtesies received, also a vote of thanks to the Committee of Arrangements, and to the officers of the present convention.

*Resolved*, That this convention adjourn to meet at Chicago, Wednesday, April 23, 1879, at 10 o'clock, a. m., and the Secretary be requested to send out notices of invitation at the proper time.

The following gentlemen were appointed as committee:

*Committee to Prepare Subjects for Discussion.*—S. B. McConnico, Chicago, St. Louis & New Orleans; H. G. Sleight, St. Louis, Vandalia & Terre Haute; A. W. Davies, Atlantic & Great Western; D. W. Tuthill, New York Central & Hudson River.

*Committee to Prepare Blanks for Combined Reports.*—A. W. Briggs, Illinois Central; F. M. Luce, Chicago & Northwestern; E. Matthews, Chicago, Burlington & Quincy.

*Committee of Arrangements.*—A. W. Briggs, Illinois Central; Geo. E. Weir, Chicago, Rock Island & Pacific; Wm. Gibson, Chicago & Eastern Illinois.

*Committee to Prepare Constitution and By-Laws.*—F. M. Luce, Chicago & Northwestern; E. Matthews, Chicago, Burlington & Quincy; T. W. Mooar, Grand Rapids & Indiana.

## Tests of Passenger Locomotives on the Chillan & Talcahuano Railroad.

[A paper by John E. Martin, Master Mechanic of the Chillan & Talcahuano Railroad, contributed to the Committee on Locomotive Tests of the Master Mechanics' Association, and submitted with their report at the convention in Richmond, Va., May 16, 1878.]

(*Continued from page* 270.)

CONCEPCION, Chile, S. A., March, 1878.

*To the Committee of Locomotive Tests, Master Mechanics' Association:*

EXPERIMENTS WITH DEAD GRATES.—*Engine No.* 9.

Since the analysis of the work done by the steam in the passenger engine would not be complete without some remarks on the cost of obtaining it, I beg to present inclosed sheet of experiments on the value of dead grates. Inclosed sketches very clearly show the different arrangements tried.

The coal used, with the exception of that in Experiments Nos. 5, 6, 7 and 8, was taken off the same pile, under cover and fresh mined. It was an inferior quality of Chile coal, containing a very large percentage of slate and clinker.

Dead-plates are much more efficient with good coal, such as was used in Experiments Nos. 69 and 70, but the accompanying sheet will show that even with bad coal, great liberties may be taken with the live grate of a locomotive without increasing the consumption of fuel or injuring the steaming capabilities of the engine.

"EXPERIMENTS WITH DEAD PLATES," ENGINE NO. 9, CHILLAN & TALCAHAUNO R. R.

*Scale* 1 *in.* = 1 *foot. March* 1878.

| | | | Ave. No. of lbs. of water evap'rat'd p'r lb. of coal. |
|---|---|---|---|
| *Fig. No.* 1.— | Total area of grate in sq. feet | 15¾ | |
| | Area of line grate " " | 7¾ | 7.44 |
| | " " dead " " " | 8 | |
| | " " air openings in sq. feet | 2¼ | |
| *Fig. No.* 2.— | " " line grate in sq. feet | 6¾ | 7.58 |
| | " " air openings in sq. feet | 2 | |
| *Fig. No.* 3.— | " " line grate " " " | 5 | 7.32 |
| | " " air openings " " " | 1.62 | |
| *Fig. No.* 4.— | " " line grate " " " | 6¾ | 7.47 |
| | " " air openings " " " | 2.14 | |
| *Fig. No.* 5.— | " " line grate " " " | 4⅝ | 7.60 |
| | " " air openings " " " | 1.60 | |
| *Fig. No.* 6.— | " " line grate " " " | 6¾ | 7.58 |
| | " " air openings " " " | 2 | |
| *Fig. No.* 7.— | " " line grate " " " | 5 | 7.75 |
| | " " air openings " " " | 1.60 | |
| *Fig. No.* 8.— | " " line grate " " " | 3¾ | |
| | " " air openings " " " | 1.30 | |

By line grate is meant the bars and openings—as in Fig. 1, for grate bars 3 ft. 0 in. × 2 ft. 2 in., and for dump grate, 2 ft. 8 in. × 6 in. The openings of grate bars are 7-16 in. bars, and those of dump grate ¼ in.

*Fig.* 1. shows the usual arrangement of the fire-grate of the passenger engines.

*Fig.* 2. A dead-plate 12 in. broad was placed at the back end of the grate, as recommended in the *Railroad Gazette* of Aug. 10, with an improvement in the evaporative results. Exhaust nozzles, double, were 3¼ in. diameter. The engine steamed quite as well as formerly.

*Fig.* 3. Here the dump grate is also dead. With this arrangement the engine did not steam well, nor were the results so good. The nozzles were reduced to 3 in., but without any improvement.

*Fig.* 4. In this trial the back-plate was removed, and the results improved. Although the area of live grate is about equal to No. 2, the results are not so good.

*Fig.* 5. The dump grate is open in this experiment, but two dead-plates, 6 in. wide each, were placed down the middle of grate. The engine steamed well, better than with No. 4, although the area of live grate is considerably less.

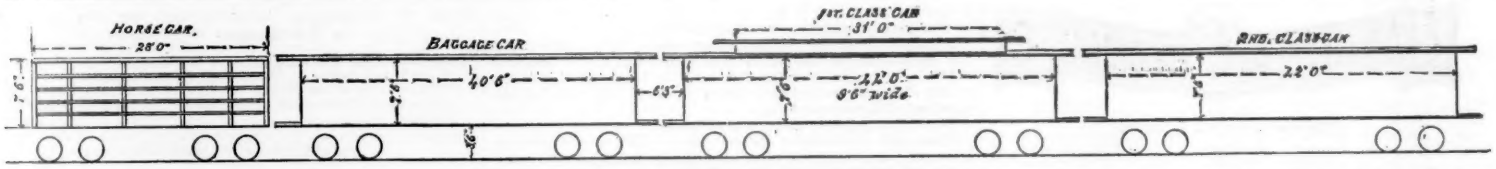
*Fig.* 6. One dead plate was removed, as shown, but with little effect either on the evaporative or steaming qualities of the locomotive.

*Fig.* 7. Is similar to No. 2, with the addition of 6 in. dead plate down the middle of grate. This arrangement gave the best results, as will be seen in the sheet of experiments. The consumption of coal per minute is about 7 lbs., or nearly 1¼ lbs. per square foot of live grate.

*Fig.* 8 was used in experiments with Puchoco coal, Nos. 68, 69 and 70. This is a very superior quality of coal, not excelled by any coal that has been tried on this railway, and I believe equal to any coal in the world for locomotive boilers. It is a very quick steaming coal, never cakes or clinkers, has a very soft coke, and contains little or no ash. The "Veta Chica" sample contains 8,400 English cubic feet of gas per ton, with an illuminating power of 19.32 candles. An analysis is inclosed. A peculiarity of this coal is the large amount of oxygen it contains.

| Opening of Fire Door. | Revolutions per minute | Vacuum in inches. | Velocity of air entering fire-box—feet per min. | Velocity of air entering fire-box—miles per hour. | Quantity of air entering fire box—cub. ft. per min. | Temperature of gases in smoke-box |
|---|---|---|---|---|---|---|
| | | | | | | deg. F. |
| 4 inches | 140 | 1 | 2,200 | 25 | 730 | 400 |
| 4 inches | 140 | 1⅛ | 2,400 | 27 | 800 | 440 |
| 4 inches | 148 | 1¼ | 2,620 | 30 | 870 | 400 |
| 4 inches | 140 | 1⅛ | 2,370 | 27 | 790 | 400 |
| Average. | 142 | 1⅛ | 2,400 | 27 | 800 | 410 |
| 5 inches | 160 | 1⅛ | 2,300 | 26 | 960 | 440 |
| 5 inches | 168 | 1⅜ | 2,660 | 30 | 1,120 | 410 |
| 5 inches | 204 | 1⅛ | 2,340 | 27 | 980 | 440 |
| Average. | 174 | 1¼ | 2,430 | 28 | 1,020 | 430 |
| 7 inches | 212 | 1⅛ | 2,120 | 24 | 1,230 | 440 |
| 7 inches | 160 | 1⅛ | 1,940 | 22 | 1,130 | 440 |
| 7 inches | 200 | 1⅛ | 1,960 | 22 | 1,140 | 430 |
| 7 inches | 160 | 1¼ | 1,940 | 22 | 1,130 | 400 |
| Average. | 183 | 1⅛ | 2,000 | 23 | 1,160 | 430 |
| 9 inches | 128 | 1⅛ | 1,570 | 18 | 1,180 | 390 |
| 9 inches | 120 | 1⅛ | 1,590 | 18 | 1,190 | 400 |
| 9 inches | 140 | 1⅜ | 1,890 | 21 | 1,420 | 415 |
| 9 inches | 116 | 1¼ | 1,650 | 19 | 1,240 | 320 |
| Average. | 126 | 1¼ | 1,680 | 19 | 1,260 | 380 |
| 3 inches | 180 | 1⅛ | 2,200 | 25 | 550 | 360 |
| 3 inches | 180 | 1½ | 2,360 | 27 | 590 | 400 |
| 3 inches | 152 | 1 | 2,640 | 30 | 660 | 390 |
| 3 inches | 128 | 1⅛ | 2,200 | 25 | 550 | 410 |
| | 132 | 1⅛ | 2,500 | 28 | 625 | 410 |
| Average. | 154 | 1⅛ | 2,380 | 27 | 595 | 394 |

The percentage of clinker and ash shown in the experi-




ments is too high, being principally small coke that remained on the dead-plates.

With Puchoco coal the engine, with the arrangement of grate shown in Fig. 8, steamed remarkably well, even with the fire-door opened a much greater amount than is ordinarily used.

I believe better results would be obtained by increasing the width of the fire-bars and reducing the openings to $\frac{1}{16}$ in. instead of $\frac{3}{8}$ in. when burning this coal.

The amount of air entering the fire-box is greater than the quantity that would enter through the openings shown, owing to imperfectly fitting dead-plates and dump-grate—say 10 per cent. more.

The exhaust nozzles, during the experiments, became of different diameters, from the deposition of soot and grease. The difference in steaming power between nozzles of $2\frac{3}{4}$ in. and 3 in. diameter was not very marked, and any irregularity in steaming was not due to the nozzles.

*Diaphragm Plate.*—In Experiments 1 to 38 a diaphragm plate was used in the smoke-box, similar to that shown in my last letter, but with a space of 6 in. between the edge and bottom of smoke-box. A damper or sliding door covering an opening of 31 square inches was placed about the centre of this plate, and, although useful for getting up steam, it did not make any difference whether it was open or shut.

When the diaphragm plate was used the smoke-box was kept perfectly clean and free from cinders.

The engine steamed a little better without it. There was no appreciable economy attending its use.

*Baffle Plate.*—In Experiments Nos. 55, 56, 57 and 58 the

FIG. 1. EVAPORATION 7.44 LBS.

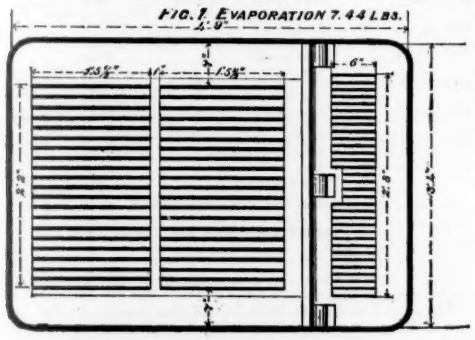


FIG. 2. EVAPORATION 7.58 LBS.

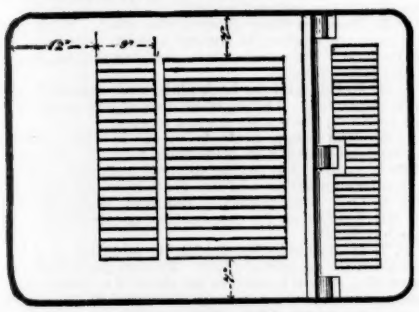
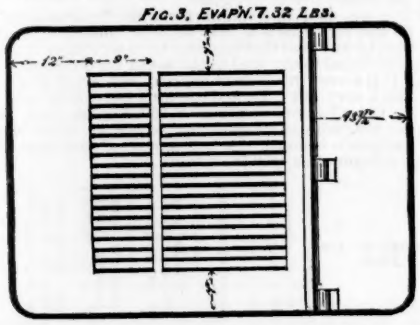


FIG. 3. EVAP'N. 7.32 LBS.



baffle plate was not used. Its use appears to effect an economy of about 3 per cent., although in former experiments I found it to effect a saving of 5 per cent.

Without the baffle plate, or deflector, a great deal of smoke makes its appearance at the mouth of stack and becomes a nuisance; we therefore consider a good long baffle plate indispensable.

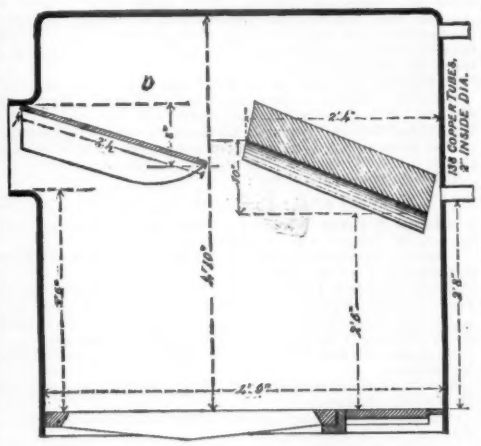
*Fire Door.*—The height of the fire door is 12 in., and during the experiments it was opened from 3 to 4 in. A difference of one or two inches in the amount opened makes no difference in the results, so long as the engine steams well. Below I give in a tabulated form the results of some experiments to ascertain the different amounts of air entering through various areas of door openings.

The instrument used was a portable air meter, and I believe perfectly reliable. It was held exactly in the door-way. I find that when held about two inches within the fire-box it indicates about 25 per cent. more than when held that distance from the door on the outside. I cannot exactly state the cause of this difference, unless it be that there is a partial vacuum within the door caused by the draft, thereby decreasing the resistance offered to the revolving faces of the instrument.

When running without steam the air enters through the door at the rate of 180 cubic feet per minute.

Allowing 150 cubic feet of air as necessary for the complete combustion of one pound of coal, and say 50 per cent. more for the imperfect combination of the gases, we have 1,575 cubic feet of air as the amount necessary for the combustion of 7 lbs. of coal per minute. Of this about 30 per cent., or 475 cubic feet, is required through the door. An opening of 3 in. gives 595 cubic feet per minute, with a speed of 31 miles an hour and a vacuum of $\frac{7}{8}$ in.

The regular speed is only 28 miles per hour or less, which,




with a lower vacuum, the average being $\frac{5}{8}$ inch, would probably reduce the amount to 550 cubic feet, which is greater than the amount above stated. I think that Chilian coal requires much more air through the door than English coal, at least such has been our experience, and we find the opening of door from 3 to 4 in. to give the best results.

The area of air openings of grate in fig. 7 is 1.60 square feet. If we suppose the air to enter this area at half the rate (owing to obstructions from coal and clinker) that it enters through the door, we will have 1.60 × 1,100 feet= 1,760 as the number of cubic feet of air entering through the

FIG. 4, EVAP'N. 7.47 LBS.

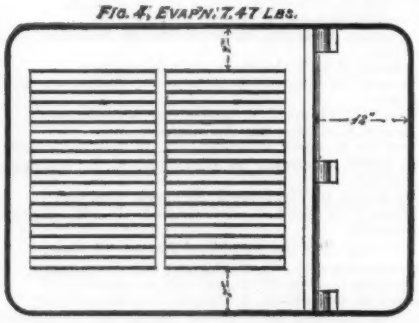
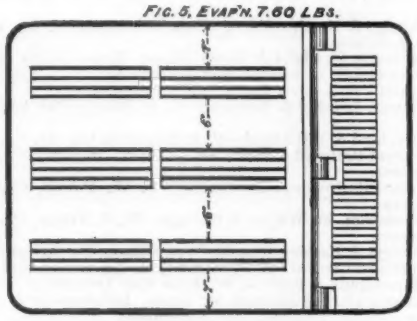


FIG. 5, EVAP'N. 7.60 LBS.



bars. This appears to prove the area of the live grate as yet too large.

By adopting the same proportion in fig. 8, we obtain 1,430 as the number of cubic feet of air entering through the bars—somewhat less, attributable to the use of better coal.

These rough calculations tend to show that at least 50 per cent. more air than the theoretical amount is required for the complete combustion of coal in the locomotive.

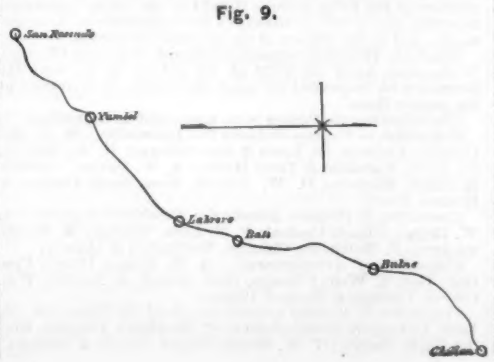
*Temperature of Gases in Smoke Box.*—Two pyrometers were attached to side of smoke-box, one above the centre close to diaphragm-plate, the other below the centre in front of and about on a level with exhaust nozzles.

Both were protected from the wind.

The average temperature of the gases was 440° Fahrenheit, the highest observed temperature being 550°. The engine was then running about 43 miles per hour and developing about 200 horse power.

The lower pyrometer generally indicated from 20 to 25° higher temperature than the upper one while running. The temperature on arrival at a station falls to 380° and 400°. After starting, the temperature frequently fell from 20° to 40°, and even more. Although the temperature of steam of

Fig. 9.




130 lbs. pressure is about 347 degrees, the temperature in the smoke-box sometimes fell below that figure while starting. This would show that too much air is admitted during the start by the stronger blasts, and that it would then be advisable to shut the fire-door and partly close the damper.

Exhaust nozzles were $3\frac{1}{16}$ and $3\frac{1}{4}$ in., unless otherwise stated.

In the experiments with the passenger engines on this road, the only varying force with which we had to contend was the wind, and, as it is necessary to take it into consideration in testing improvements in valve motion, the experiments were made with two anemometers, which are considered perfectly reliable. Accompanying sketch shows the line of road, $62\frac{1}{4}$ miles, over which the trials were made, and the direction in which the wind blows. It will be seen that the prevailing or south wind strikes the train at a most unfavorable angle.

The line between San Rosendo and Chillan runs over extensive plains where the wind blows with equal force, and where there is no protection against it for the train.

The speed, about 28 miles an hour or perhaps somewhat more, and the weight of the train, 200,000 lbs., being constant, the water used on five calm days is invariably the same and found to be for the up trip (San Rosendo to Chillan) $19\frac{1}{2}$ in. of water, or 800 imperial gallons, and for the down trip 18 in., or 738 gallons.

When there was any wind, its force was measured in Bulues, Itata, Cabaero and Yumbel. Generally three observations were recorded on the trip, and the water used carefully measured on arrival in Chillan and San Rosendo.

FIG. 6, EVAP'N. 7.56 LBS.

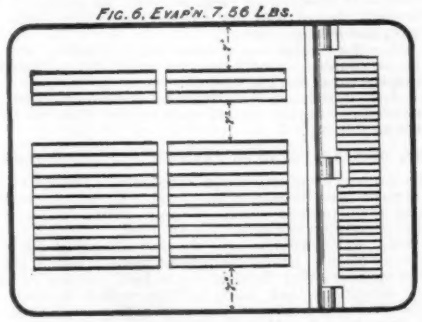


FIG. 7. EVAP'N. 7.75 LBS.

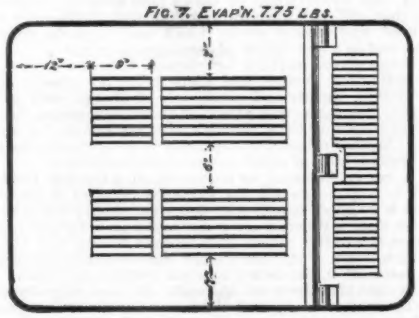
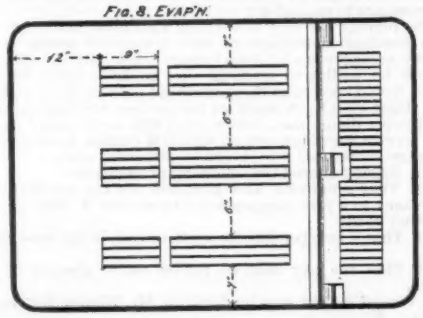


FIG. 8. EVAP'N.



EXPERIMENTS WITH ANEMOMETER—NO. 6 PASSENGER ENGINE, CHILLAN & TALCAHUANO RAILROAD.

| DATE. | Up or Down. | Force of wind in miles per hour. | Water used; inches..... | Extra expenditures; per cent. | Direction of the wind..... | Extra stops at flag stations... | Extra stops for cattle on track. | Extra stops discharging cattle. | Observations. |
|---|---|---|---|---|---|---|---|---|---|
| Jan. 1, '78. | Down. | 8 | 20⅛ | 11 | South. | .... | 3 | .... | |
| Jan. 3, '78. | " | 7½ | 19⅝ | 8 | " | 4 | .... | 1 | |
| Nov. 23, '77. | " | 10 | 20¾ | 14 | S.West. | .... | 3 | 1 | |
| Nov. 30, '77. | " | 10 | 21 | 14 | South. | .... | .... | 1 | |
| Dec. 4, '77. | " | 10 | 19⅝ | 8 | " | 1 | .... | .... | Nozzles reduced by dirt to 2¾ in. |
| Dec. 11, '77. | " | 10¼ | 20¼ | 11 | " | 1 | .... | 3 | |
| Nov. 4, '77. | " | 11 | 24⅛ | 26 | " | .... | .... | .... | Not comparable owing extra delays..... |
| Nov. 11, '77. | " | 12 | 20⅝ | 13 | " | 1 | .... | 1 | |
| Jan. 14, '78. | " | 12 | 18⅛ | 5 | " | 1 | .... | .... | Nozzles reduced by dirt to 2¾ in. |
| Nov. 26, '77. | " | 14½ | 24 | 25 | " | 2 | .... | .... | 15 min. delay. |
| Nov. 15, '77. | " | 15 | 24 | 25 | " | 1-2 | .... | 1 | |
| Jan. 25, '77. | " | 15 | 21¾ | 17½ | " | 2 | 5 | .... | |
| Dec. 13, '77. | " | 17 | 23⅜ | 25 | " | 2 | 2 | .... | Nozzles reduced by dirt. |
| Dec. 19, '77. | " | 18 | 24⅛ | 25 | " | 1 | 1 | 2 | " " " |
| Oct. 29, '77. | " | 20 | 23 | 30 | " | 1-2 | 1-2 | 2 | |
| Dec. 30, '77. | " | 30 | 16⅜ | 8 | North. | 1 | .... | 1 | Wind favorable, 3½ in. clean nozzles. |
| Nov. 18, '77. | Up | 8½ | 21¼ | 9 | " | 1 | .... | 1 | |
| Oct. 28, '77. | " | 12 | 21⅝ | 10 | Cross. | 1-2 | 2 | 1 | |
| Oct. 26, '77. | " | 14 | 24½ | 20 | Crsdhd | 3 | .... | .... | |
| Jan. 10, '77. | Down. | 17 | 22⅝ | 20 | S.East. | 1-2 | 6 | .... | |
| Nov. 13, '77. | " | 17 | 24½ | 27 | South. | 1 | 1 | 2 | |

There is a slight variation in the results, due to varying

size of exhaust nozzles, from the deposition of dirt and to extra delays or stops in stations.

I accompany this with a diagram of the trains, but have no time to make any remarks on the effect of a greater number of cars, speed, etc., but leave this to the committee,

Remaining yours sincerelv, JOHN E. MARTIN.

Concepcion, Chili.

## The Basis of Payment for Car Service.

[Paper read by J. T. Rigney, of the Baltimore & Ohio Railroad, before the Car Accountants' Association, at the Third Annual Convention, in New York, April 26, 1878.]

Mr. CHAIRMAN: The car service question is a vexed one. The use of cars has always been unsatisfactory, and will continue so to be as long as the present system of usage exists, under which neither protection or penalty is afforded.

Especially to a company having a large equipment which is permitted to go from home is it non-paying as well as unsatisfactory. Not because all the miles may not be accounted for; but for the loss they sustain by the inattention given to foreign cars, whereby they remain from home instead of being promptly returned to owners. A remedy is needed for this inattention and detention, and one must be found that will prevent it.

Mileage, as reported, is now the prevailing pay for use of cars in all cases. Under the present mode of usage, the custom of appropriating foreign cars to local service causes so many detentions that much mileage cannot be made, and the question arises, Does it pay owners to permit their cars to go from home? If it does not pay while business demands the interchange of cars, a plan must be sought and used, if found, that will pay owners, and that will, at the same time be true and remove every doubt and suspicion from reports and be a preventive of detention to cars.

Mileage allows nothing for idleness though a car remains on a siding for months, and, there being no remedy under the mileage system, agents and consignees discharge cars at their pleasure. Managers move them at their convenience, because they pay nothing for a month's idleness, but do for a day's run. Neither protection nor penalty is given under the mileage system, both of which I deem necessary.

In the car service question as it stands to-day, suspicion is entertained by many that reports may not always be true, and a remedy is needed that will remove every doubt and be free from suspicion, and satisfy all that they are receiving and paying for what is just—no more and no less. To put the matter in a position that will not leave it optional with a reporter to make a true or false return, as he may elect, is my object in addressing you.

From every standpoint of mileage pay and reports, in all the plans for miles run, however devised, in whatever way and however often reported, look at it as you will, there is a loophole to creep through and evade the law.

Any car that is permitted to lie idle, or is detained, is through the neglect of an agent or the implied consent of the manager. The consent is undoubtedly with the belief that it pays the manager in some way; and the neglect is through indifference to the owner's interests. If the manager receives value for the car, the owner is entitled to the pay and the manager is responsible for the payment. The loss through indifference and neglect should not be borne by the owner of the car.

If a car is damaged or destroyed on a foreign road, the road is responsible for its value by repairs or payment. There is no good reason why detentions should not have protection also. I therefore offer a plan that will be effective to meet all requirements for prompt handling and movement of cars, besides having simplicity, honesty, economy and profit in its working. Simplicity, because of its mode of keeping and settlement; honesty, on account of every car having an equivalent every day; economy, in its lessening expenses; and profit, in the greater production of service.

If a car is destroyed on a foreign road, it is often left to the owner, after lapse of a long time, through search, to learn of it. During the time between destruction and restoration, the owner does not receive one cent, though months may elapse before the matter is adjusted; the loss of time is entirely at his cost. Does any one doubt that prompt settlement would be made if a well-defined obligation was in existence to compel it?

Sometimes, when a car is absent for a long time, investigation shows that, after several swappings by foreign roads, it is on a siding used as a warehouse. The owner's interest is lost sight of, and, at his cost, the car is waiting the convenience or inclination of the consignee. Owner must wait; he has no remedy.

If the matter sought is only to think you get a knowledge of the location of a car for the satisfaction of believing it was at a certain point at a given time; or to take the chance of supposing that all the miles run are reported, and the only object is to get mileage earnings, we might stop just where we are and not pursue the subject; but, though knowledge of the whereabouts of cars and the number of miles they run may be important, these are secondary to my object and not at all contemplated in my present view. I pass them and go beyond to an issue vastly greater in importance, that is not reached or reconciled by a mileage system, and to which, in comparison, the mileage revenue is insignificant.

Railroad managers, like other men of business, are constant seekers of revenue, and, to increase it, not only by increasing their trade, but also by lessening the cost of getting it. Their endeavor is to make every source of revenue profitable and to cut down to the minimum everything that costs to procure it. With them, the problem is economy and profit. Their revenue is produced through the means of cars as necessary appliances; and their cost for cars to work their problem must, therefore, be brought to the lowest, while they must endeavor to make them bring in a constantly increasing revenue and to have no more than are sufficient for their business. To keep down the standard to this point is the gist of the matter.

I remark that every thousand cars added to equipment costs say half a million of dollars. The transportation business of the country may spring up to such a degree as to raise a cry for more cars, and demand is made for many thousands to be added to the combined equipment of the roads here represented. If, however, instead of getting these additional cars, it can be arranged so that the existing number can, by prompt handling and quick movement, be made to do the work of such increase, in addition to what it now does, there will be saved the cost of several millions of dollars in principal, several hundred thousand dollars annually as interest on this principal and the cost of maintenance of the additional equipment—sums much greater than centuries of mileage would amount to. Then the problem is solved as far as it relates to cars.

This can be done through a per diem rental of cars. As a further economy, the number of lost car agents will become fewer on the pay rolls, while their number would increase in fact by superintendents going into the business. Every manager would be on the *qui vive* and keep cars moving. The constant movement of cars homeward would ensue; and, if there were any idle ones on a road, they would be home cars at no cost, and at owner's hands for emergency. All roads would be willing to let their cars go from home because they would get paid for their absence, and know that cars would get home at the earliest moment possible.

By the per diem plan, every road will know every day its car service earnings, out of which it cannot be defrauded. This knowledge will be independent of reports from other roads. All mileage clerks and reports can be dispensed with. Every road will have to toe the mark and come to payment. Also, every road will know daily how much it owes for use of cars, and will always have some defense against overcharge: All this without cost of any kind.

Every aspect of per diem rental is economy—to the borrower a great one. I quote, as a showing, a car that ran on a foreign road:

| | | |
|---|---|---|
| January 4 | 117 | miles. |
| " 5 | 25 | " |
| " 10 | 25 | " |
| " 11 | 117 | " |

making 248 miles in six days; but the car did not again move until the 17th, when it was given empty to a connecting road. Fourteen days were consumed to make 284 miles. Ten of these days were idle ones. The road having the car paid $2.13 mileage for it. Now, if instead of mileage, a rental was the payment, the road, forced by economy, instead of holding the car 14 days would have ran the car the whole distance, 142 miles in one direction, in one day, and back again on another day. If it paid for the car on the day of receiving it, the rental would be received back again on the day of re-delivery, and, if the trip both ways was made in two consecutive days, the whole mileage of $2.13 would have been saved to the road. The road would have received the freight earnings on its line, had the use of the car, and paid nothing for it. So would it be in many cases, and managers would have to blame themselves if they had to pay more car hire than necessary, as the expense or economy would depend entirely upon their activity in handling cars.

Again, a road received a lot of loaded cars March 21 and delivered them to a connecting road on the 23d, the mileage on each being 255 cents. Under a per diem, say 50 cents, the money paid on the 21st would have been received back on the 23d, leaving only one day to be accounted for (50 cents). The road would have saved 205 cents on each car. The road that received the cars on the 23d delivered to owners on the 24th, paying 145 cents on each. Under the per diem, the entire amount would have been saved to this road. The road owning the cars would, apparently, be the losers to the amount of the difference; but would be fully compensated, through quick handling, in its additional freight capacity and consequent increase of equipment.

Intermediate roads over which cars pass without halting would have the benefit of the freight earnings at no cost for car hire, because whatever it paid when receiving a car at one end would be received back again when delivering it at the other end.

The question may be asked, Suppose a car has passed over several roads during its absence from home, how will you know how many days it was on each road (except from their reports), and how much truer and more reliable account will you then get than you would get of the mileage? I answer that I will not depend upon such reports. My reliance will be upon the plain rules of addition and subtraction (having the figures in my own hands) and multiplication to make up the divisions and of earnings.

Instead of paying for the use of cars according to miles run as reported, true or false as the report may be—and by which all roads are losers—a pay per day is the only plan in which there can be no evasion; and by which every car away from home will produce a revenue every day to its owner.

Some say it is necessary to hold empty foreign cars to be ready for trade when it springs up. How often has the cry been wolf when there was no wolf? How often have empty cars been rushed for pressing demands, and when they arrived at point of demand there was no use for them because of the fluctuations of business? This mis-sort of arrangement is costly to all roads passing the cars and can be done away with profitably. Under a well arranged and carried out plan this can be avoided, and more freights handled and sooner got to market, greater earnings would be derived and less car hire paid. Suppose a train consists of 20 empty cars the entire distance, and a cry comes for them and they go 800 miles. If you allow the modest sum of 50 cents a mile for the cost of the train, it costs four hundred dollars to get the cars to the cry, in addition to which the mileage is worth one hundred and twenty dollars. If there is no use for the cars when they arrive, the money has been thrown away, and the cry has hurt every road over which the cars passed by adding unnecessarily to their expenses.

I submit whether it is better to put your empty cars out of your reach, to encumber sidings of other roads, and get nothing from them, or to have them at home at your pleasure for use, and ready for emergency and no less receipts for earnings; and, also, whether it is better for a road to have empty foreign cars blocking its sidings for months, or to wait until cars are actually needed, and then procure them at a saving of the difference between per diem and mileage pay (more than 50 per cent.) in cost for their use, without counting their freedom from the incumbrance of their sidings?

Has any one of you thoroughly investigated the subject of mileage pay in all its bearings of comparison? Do you know how many cents per day your cars averaged away from home, and how many cents you pay for foreign cars on your line? or, rather, do you know the difference between what you pay and what you receive per car per day? I know that you think that three-fourths of a cent per mile settles up. I concede that you pay and get paid for every mile run; but do you know how much you pay and receive upon the average days and miles in the time of absence for a day's use of a car, what (making all cars equal) a car nets you? If you do not, I advise you that have many cars away from home to look into it and be enlightened. You that have few cars may have the use of other people's for less than you now pay.

My story is told. It is not one of bound fiction, printed upon gilt-edged leaves; but a plain, unvarnished, condensed, matter-of-truth history, to the consideration of which all are invited—for there's millions in it.

I assume that managers are responsible for the use and abuse of foreign cars; that they must take as much care of them as of their own; that all cars are equal in value in service. I therefore propose that car service shall, as a matter of economy and profit, be paid by all roads to their connecting lines at a per diem rate upon all cars, foreign and home, arriving to them, and collect in the same way on all cars going from them. This will simplify and give a true settlement upon the evidence of the difference between exchanges; having to go for settlement only to the next-door neighbor, instead of running over the whole country to collect amounts which are, in some instances, believed to be not true. Thus all roads will, in a manner, become owners of all cars—take care of them and pay for them while in possession. Nobody will be hurt; no road can escape.

These links, coupled together, will form a chain strong enough to hold the service of all cars with a lever that will prove an automatic brake applied to a rolling stock which is at the present time believed to be unreliable, figuratively. They will tie it down with a joint that will know neither contraction nor expansion, that no fuel—anthracite, bituminous nor resinous—can raise steam enough to make a gauge necessary; and will a true verdict give, according to the evidence, without the assistance of a returning board, or light reflected from an 8 by 7 glass on a narrow compromise of 3 and 2. A bell-punch will not be necessary to check 'em up—per diem being outside of all ring performances.

I offer the following propositions:

1. That a uniform and adequate pay for car service is necessary to a just compensation to owners of cars passing to other roads.
2. That a rate per day for such service is the most equitable.
3. That the pay shall be for the entire absence of the cars.
4. That the receiving road shall be responsible for this pay, and shall pay to the road from which it receives the cars.
5. That this pay shall be for all cars—home and foreign.

## The History of the Atlantic & Great Western.

A correspondent of the *Railway World* gives the following sketch of the origin and the vicissitudes in the history of this railroad, whose later history is better known than its early history, recent as the latter is:

It is as well that the American people should be enlightened with respect to this very much financed company. Its first prospectus was issued by Messrs. Haseltine & Powell, and other respectable London stock-brokers on Sept. 27, 1860. It said: "The line possesses extraordinary facilities for construction, having no tunnels, no deep cuttings, few bridges, and no fences; avoiding the Allegheny Mountains on the south, and occupying the natural channel of trade between them and the lakes of the north. It traverses some of the most fertile portions of New York, Pennsylvania, and the 'Garden of Ohio.' It passes through the large shire towns or centres of fourteen counties in the state of Ohio, with more than 1,000,000 inhabitants, and a taxable property of $260,000,000, and accommodates seventeen cities and towns in New York and Pennsylvania, heretofore without railway facilities."

The prospectus also stated that the contract cost of the entire undertaking was $37,000 per mile. As it is but 420 miles long, the aggregate cost ought, therefore, to not have been over $15,540,000. At the present time the company has a funded debt of $59,000,000, and, as no interest has been paid thereon for four years, that debt is increased to about $76,000,000. Its share capital is $34,661,548, which runs its total capital account to upward of $100,000,000. It also has leased lines, rental trust bonds and Western extension bonds and certificates outstanding to the amount of $12,731,500, upon which only a portion of the interest is paid.

It is asserted that the Atlantic & Great Western was constructed as an "extension" of the Erie line, and that the Erie Company has always broke faith with it. These assertions, frequently repeated, are incorrect. There was an agreement between the two companies by which the Erie covenanted to pay a bonus of 10 per cent. upon whatever traffic the Atlantic & Great Western gave it "during five years from completion, and 5 per cent. for another term of five years thereafter." The line was completed in 1864, and the agreement which had been carried out up to that time, was abrogated by James McHenry on Dec. 7, 1868, as owner of most of the Atlantic & Great Western shares, which had been issued to him as contractor. On that day he leased the line to the Erie Company for twelve years, at a rental of 30 per cent. of the gross receipts, which rental, one year with another, was to average $1,800,000, and against the rental the Erie Company advanced him $1,500,000 in cash. Besides the lease, there was an agreement by which he was to sell his Atlantic shares to the Erie directors, so that they might control the franchises of the Atlantic Company. The shares, however, were mostly hypothecated in London; Mr. McHenry was unable to redeem them, and, consequently, the lease fell through. In these circumstances it was eventually agreed between the parties that the $1,500,000 cash advanced should be deemed the rental for the term expiring Dec. 31, 1869, and that the Erie should work the line at cost from Jan. 1, 1870, "until foreclosure and sale, or the removal of the receiver." In accordance with this arrangement the second lease lasted until Aug. 31, 1871. The Erie Company, as shown by the London accountants' report of Oct. 6, 1874, lost by these arrangements with the Atlantic Company, $1,667,908.

After an interregnum of nearly three years, Mr. McHenry again, on May 6, 1874, leased the Atlantic line to the Erie Company, when Mr. Watson was President thereof, at 28 per cent. of its gross receipts for the first year, 29 per cent. for the second and 30 per cent. for 99 years thereafter. These percentages, however, were illusory, as the general railroad law of Ohio, of April 14, 1873—to which the Atlantic Company is subject—requires lessees companies, no matter what the percentage named in the leases may be, to pay *not less* than the net earnings as reported to the Legislature for the year previous to the signing of the same. The net earnings, as so reported, amounted to $1,835,959 or 34$\frac{34}{100}$ per cent. of the gross receipts. Mr. Jewett subsequently discovered, as he says in his report of May 13, 1875, that the net earnings of 1873 were contrived by charging the following items to capital which ought to have been charged to revenue: Hire of rolling stock, $586,164; taxes, $91,529; maintenance of way, $486,961—a total of $1,348,995, reducing the actual net earnings to $486,961. This is the reason given for the non-fulfillment of the third lease.

The Atlantic & Great Western has been in the hands of a receiver since Dec. 10, 1874. His report for 1877 shows that the line, including rentals, was worked at a cost of 96$\frac{75}{100}$ per cent. It also shows that from the time he took charge of it until Dec. 31, 1877—3 years and 21 days—the net income was but $376,707, out of which had been expended, for "additions and betterments," $254,742, leaving a net surplus of $121,965, or 1$\frac{59}{100}$ per cent. of the gross receipts. The report adds that "under orders of the court," there had been expended $1,051,573 over and above the cash collected from the company's assets. That amount is secured by receiver's certificates, which form a first charge upon its property. As things have turned out, it would have been better that the company had never existed; it was always shunned by the Americans, who did not contribute a cent toward its construction. The money was extracted by the puffing of English financial writers, from the widow and orphan classes of Great Britain. Only about $20,000,000 was actually expended in America upon the railway, the balance was squandered in England.

## Creosoting Works.

Mr. Edward R. Andrews has leased an establishment at Elizabethport, on the line of the Central Railroad of New Jersey, for creosoting timber, and has equipped it for treating cross-ties, piles or other timber by that process. The process is extensively, or, it may be said, generally, used in Europe, and the time is not remote when it must be used here very generally.

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## EDITORIAL ANNOUNCEMENTS.

**Passes.**—*All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.*

**Addresses.**—*Business letters should be addressed and drafts made payable to* THE RAILROAD GAZETTE. *Communications for the attention of the Editors should be addressed* EDITOR RAILROAD GAZETTE.

**Advertisements.**—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

**Contributions.**—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

## VALVE GEAR.

Probably to most railroad presidents, superintendents and traffic managers, the discussion of the merits of various forms and proportions of valve gear seems as purposeless as the consideration of the problem proposed recently in a mathematical journal, whether "if a fourth dimension were added to space, a closed material surface (or shell) could be turned inside out by simple flexure, without either stretching or tearing." To the majority of such persons valve gear seems to be only a sort of puzzle, in the discussion and solution of which engineers and master mechanics find some amusement or diversion. That a proper understanding of it by master mechanics will result in a direct economy of thousands of dollars, and diminish the immediate drain upon the treasury of the company by which they are employed by that amount, is, unfortunately, not believed to be true, excepting in a sort of mythical way, which has no practical or available relation to the operating expenses of ordinary railroads. The cost of fuel is, however, a practical thing, and is materialized monthly by one or more checks and a reduction of the bank balance by an amount equal thereto. Anything, therefore, which will give to this subject of valve gear a practical character and will assign a value to what ordinarily appear to be unknown quantities, will serve a most useful purpose. This has been done, it is thought, by the excellent report of Mr. John E. Martin of experiments which he made on the Chillan & Talcahuano Railroad of South America, which were published in the *Railroad Gazette* of last week. These experiments were made to determine certain points which have been discussed a great deal of late and about which there has been much difference of opinion. Any one who has paid much attention to the discussions at the annual convention of the Master Mechanics' Association must have observed the great difference of opinion which has existed concerning the size of the steam-ports of locomotives, which, as we are writing for some who are not familiar with the technical terms used in describing locomotives, may be described as the openings through which steam is admitted to and from the cylinders. There is a number of prominent master mechanics who within a few years have taken the ground that the steam-ports of locomotives have been made very much too large, and consequently in new engines which they have built or ordered the ports have been diminished in size to about one-half the diameter of the cylinders, while in ordinary practice the length has been made somewhat over seven-eighths. Considerable economy has been claimed for this change, and on some lines the engines are all built with "short ports," while one road, we have learned, has two engines in course of construction, both of which are built exactly alike in other respects, but one is made with short and the other with long ports, so that the whole question can be tested in the most thoroughly practical way.

The ground upon which the superior economy of short ports is based is, that with their diminished size steam passages will be smaller and therefore a less quantity of steam will be required to fill them at the end of each stroke. It may be further explained that in practice it has been found necessary to leave a space from $\frac{1}{8}$ to $\frac{5}{8}$ in. between the cylinder heads and the piston when the latter is at the end of its stroke, so as to be certain that it will not strike the cylinder head. This space with that of the steam passages is called *clearance space*. Now at the beginning of each stroke it is plain that this *clearance space* must be first filled with steam before it can exert its pressure on the piston. If this space is reduced, it is said that a less quantity of steam will be required to fill it, and thus, *apparently*, a great saving in steam will be effected. This view of the subject is a very common one, and therefore, as we have said, the conclusion has been somewhat hastily adopted that if the steam passages were reduced in size an amount of steam would be saved at each end of the stroke equal to the reduction in the size of the steam passages or the clearance space. But suppose we had an engine with say 400 cubic inches of clearance space, and that we had a valve gear so arranged that this space could be filled with steam at boiler pressure and the valve be closed *before* the piston commenced its stroke. In that event it is obvious that the steam by its elastic force would exert a pressure against the piston which would diminish as the piston moved; or in other words, this steam would act expansively and would *do work*, and would therefore *not be wasted*. It would on the other hand do very nearly as much work as it would if there had been no clearance, and the same amount of steam had been introduced into the cylinder after the piston began to move. The precise difference in the amount of work done in the two cases will not be considered now, as it would lead to the consideration of more abstruse questions than we care to take up at the present time, but that the whole amount of steam required to fill the clearance spaces is not lost must be obvious.

But there is another element which has a very important bearing upon this subject. Any one familiar with the working of the link motion knows that it causes the valve to close the exhaust ports *before* the piston reaches the end of the stroke, and that a certain amount of steam equal to, or a little above, atmospheric pressure is thus confined in each end of the cylinder and is compressed by the movement of the piston into the clearance spaces. Another peculiarity of the link motion is, that when the valve is worked so as to cut off the steam at a short point of the stroke, the exhaust is closed earlier than it is when steam is admitted during a larger proportion of the stroke. Thus with ordinary valve gear when steam is cut off at about one-fourth of the stroke, the valve closes the exhaust when the piston has still about one-fourth of the stroke to move. When steam is cut off at seven-eighths of the stroke the exhaust does not close until the piston reaches the last inch or less of its stroke. In the first place, about a quarter of a cylinder full of steam is inclosed in front of the piston, and this must be compressed into the clearance space. If the latter is larger, the final pressure in it when the piston has completed its stroke will be less than if the space is small. In the latter case, where steam is cut off short, the pressure of the confined steam often rises above boiler pressure, and in this way the back pressure becomes excessive and wasteful. It will be seen, though, that if the clearance spaces are filled with compressed steam of boiler pressure before the one stroke is ended and the next begins, in that case no live steam from the boiler will be required to fill these spaces at the beginning of the stroke. In fact, in some cases where there is an excessive amount of compression, the pressure in the clearance spaces will be greater than that in the boiler, and the flow of steam when the valve is first opened is from the cylinder into the steam-chest instead of the reverse direction, because the pressure due to compresssion was greater than that in the boiler. This is shown in a number of indicator cards taken by Mr. Martin and published last week, as in Nos. 5 and 20.

It may be said that the way out of this evil is to so proportion the valve by giving less exhaust lap or to give exhaust clearance so that compression will not begin so early in the stroke. Unfortunately if this is done we increase the evil of a too early release of the steam. In other words, with a link motion, when steam is cut off short, or say at one-fourth of the stroke, as already explained, the port is opened to the exhaust when the piston has only completed about three-quarters of the stroke, and before the steam has had time to exert its full expansive power. If we diminish the lap or give the valve clearance on the exhaust side to diminish the compression, the release of the steam will occur still earlier in the stroke.

It will therefore be seen that the clearance spaces afford a very effective means of overcoming the inherent defects in the link motion when working steam to high rates of expansion, or "cutting off short," and that instead of being an evil a proper amount of clearance space is a positive advantage, and that the economy which is attributed to short ports from this source is in all probability an imaginary one. It is true that the advantage to be gained by clearance spaces is less as the period of admission is increased, and probably vanishes altogether when it approaches full stroke; yet as the greater part of the work of a locomotive is done when working more or less expansively, the advantage on the whole is greatly in favor of a proper amount of clearance.

In order to test this matter experimentally, Mr. Martin made his experiments by facing off the cylinder heads and riveting to them wrought-iron plates so as to reduce the clearance to $\frac{1}{8}$ in. The results of his experiments as given in his own words are:

"1st. A reduction of power developed with the same boiler, pressure and speed, equal to about 14 per cent.

"2d. A consumption of from 3 to 5 per cent. more steam per indicated horse power per hour.

"3d. A greater proportion of back to gross pressure, amounting to 10 per cent."

The second conclusion certainly shows that the consideration of this subject has a very decided practical value. While it is true that a saving of from 3 to 5 per cent. in the experiments made does not indicate an equal total saving of the whole amount of fuel used, yet it shows that a careful study and understanding of this subject has an importance which it is very costly to disregard.

Mr. Martin made a number of experiments having a direct reference to the size of the ports. These were made in such a practical way that the wonder is that it was not done before. It was "by riveting strips of metal to the edges of the valves," so that the length of the port opened was made first to $3\frac{1}{2}$ in., then increased to $8\frac{1}{2}$, $9\frac{1}{4}$, 12 and 14 in. In each case the steam was wire-drawn more as the size of the opening was reduced. Of the results of these experiments we give the experimenter's conclusions, which are that:

"A long port in length equal to the diameter, or nearly so, of the cylinder, is superior to a shorter one for the admission of steam, owing to the small amount that the port is opened when cutting off short.

"In every case the power developed by the longer port is proved to be the greater; and further to be obtained with a decreased consumption of steam per horse power.

"If the port itself had been reduced in size, instead of reducing the opening merely, by putting the strips on the valves, the results would have been still worse, because exhaustion would have been imperfect and the amount of clearance space insufficient."

Surely such testimony as this should lead the advocates of small steam-ports to doubt the soundness of their views. It is true that those who use very short ports usually make up what is lost by a reduction in their length by increasing the travel of the valve. The engine used by Mr. Martin had, however, a maximum travel of $5\frac{1}{4}$ in., which is quite liberal. It should be kept in mind, though, that the disadvantages of short ports are greatest when cutting off short. With longer periods of admission the evil resulting from their use gradually disappears. What is remarkable, however, is that those who believe in short ports do not use the Allen valve, illustrated on page 225 of the "Catechism of the Locomotive." This valve gives double the amount of opening when cutting off short that an ordinary valve does, and thus, to a very great extent, obviates the evils due to a reduction in the size of the ports.

With reference to the advantages of a small over a large exhaust nozzle or blast orifice, we are inclined to dissent from Mr. Martin's views. While it may be true that some economy was apparent in the use of a small nozzle at the speeds and with the short periods of admissions employed during his experiments, it seems probable that with greater speed and longer periods of admission, this economy would have disappeared. Be-

sides, a reduction of fuel consumption is not always economy. It seems probable that with small nozzles the maximum power of a locomotive would be very materially diminished when working steam at full stroke, or at points near full stroke. If the maximum power of the engine is reduced, all economy due to a saving in the consumption of fuel at once vanishes by the relative increase of other train expenses. As we have taken occasion to point out often heretofore, the average cost of the locomotive runners' and firemen's wages is equal to the cost of fuel, and if the wages of the brakemen and conductors are added, the aggregate will be considerably greater than the cost of fuel. Therefore, if the maximum power of a locomotive is diminished, in many cases the amount of work done by the train-men is reduced to the same extent, and, therefore, more is lost in that way than is gained by saving fuel.

Enough is, however, shown by Mr. Martin's experiments to indicate that the subject of valve-gear is worthy of the most careful and intelligent investigation, a fact which locomotive superintendents are usually quite conscious of, but of which, unfortunately, their superior officers are often quite oblivious. Coal bills of almost any dimensions will be paid without a murmur, but a requisition for a steam engine indicator by the machinery department would usually be regarded as an entirely useless piece of extravagance.

The experiments on grates published in this number are also well worthy of attention, but comment on them must be reserved for a future occasion.

## Elevated Railroads in New York.

Although New York has had an elevated railroad in operation for several years, and for the last two or three in successful operation, yet the opening of the new line in Sixth avenue this week—the Gilbert Elevated, which is now transformed into the "Metropolitan" Elevated Railway—has been received by the city press, and largely, too, it must be confessed, by the city people, as the real beginning of rapid transit. This is not because traveling on the new line is any more "rapid" than on the old one: on the opening day the speed was substantially the same, and there is very little object in increasing it for roads no longer than these now are; nor is it for any marked lack in frequency of trains and other accommodations on the New York Elevated Railroad. The latter has done good service and afforded very fair accommodations for the three years and more that it has had sidings enough to enable it to run trains eight minutes apart, leaving considerable room for improvement, but still affording accommodations so vastly superior to those of the street cars and omnibuses that it was not for New Yorkers to complain. The reason, then, why the new road excites so much more attention than the old one ever did is not due to its greater speed or frequency of trains or its handsome cars, but chiefly, without doubt, to its position near the centre of business and population. It takes the people where they want to go, which can be said only in a very restricted sense of the old New York Elevated Railroad. That starts right, but it leaves lower Broadway further and further to the east, so that above the first four stations, or about a mile, it is too distant to be convenient to that great central artery of New York. But this is not so bad as its course above the business quarters. When it reaches Ninth avenue, 2½ miles from the Battery, it is not only three-quarters of a mile from from Broadway, but it is for most of the rest of its course about half a mile west of the better residence quarters. There are people enough living on its line, but they are not the people who do business on Wall street and lower Broadway; and a very small proportion of them use the road. This, with its distance from the centres of retail trade between Tenth and Twenty-third streets on Broadway and Sixth avenue make it almost useless to ladies who are shopping, and thus it is deprived of one very large branch of traffic. The fact is, the larger part of the richer people of the city cannot conveniently use a railroad in Ninth avenue; and these people, a small fraction of the total population, do a pretty large fraction of the traveling—a still larger fraction of the traveling that costs ten cents a trip or twenty cents every day, for reasons that need no explanations to working men at a dollar and a half a day and girls at three dollars a week.

Now the new road is closer to Broadway down town, quite conveniently close to the retail trade of Broadway in its middle course, and directly through some of the best residence quarters of the city in its upper course. It is conveniently placed for the use of a great many of the "best people."

This road, whose application to have its name changed to the "Metropolitan," was granted, last Wednesday, has been substantially completed as a road for about a month. But the stations, switches, signals, yard and working appliances remained to be provided, and thus it was only this week that passengers could be carried, and even now the stations are far from complete. As we write, the road has been open for traffic but a single day, and then, to a certain extent, experimentally, without a regular time table, or, apparently, a fixed speed for trains, the continuous double track and the signal arrangements making it possible to run the road safely with irregular trains. Monday and Tuesday of this week there was an almost constant drilling with trains, as the capacities of road and rolling stock had to be developed by experiment, and the entire force for what is probably the heaviest traffic in America—the largest number of daily trains—had to be broken in at once. It is then not now possible to say just what the working of the road will be; it has not yet been fairly tested and it is not yet quite ready. But some idea, at least, may be had of the way it begun.

Most notable of all, perhaps, was the amount of traffic, the trains appearing to be generally full at some point of their run, and that not only in the morning and evening, but also in the middle of the day. Indeed, about noon many were standing in the cars and seats intended for one man holding two, or one and a half—a child often squeezing in by the side of an adult. After six o'clock enormous crowds were standing on the stations down town which could not get on the train. However, we may not certainly infer from this that the road will have all the passengers it can carry from the first. In the first place, it was a novelty, has been much talked about and long waited for, and everybody was curious to ride on the new road and in the handsome cars which have been conspicuous objects on their high perches in the street for some time; and in the next place, the road was run irregularly, and we are not now able to say how many trains were actually run. Sometimes, certainly, they were considerable intervals apart—frequently ten minutes, we should say, and sometimes much more. It is evident that the traffic which makes crowded trains ten minutes apart may be very easy to handle with trains five minutes apart.

But the character of the passengers showed sufficiently that the new road supplies a demand. They were quite different from those who for the past two years have traveled on the New York Elevated road, and among them were considerable numbers of women and children, many of the former carrying paper parcels with the imprint of some well-known Sixth avenue retailer. This latter gives reason for suspecting that the structure which the Sixth avenue people fought, as likely to greatly injure their trade, may not be even to them an unmixed evil.

This road, as some readers out of New York may not know, is on the same side of the city as the New York Elevated. At Morris street, about a quarter of a mile north of the southernmost point of the city, the Battery, they have stations alongside, about 200 feet west of Broadway. Thence as they go northward they diverge, and in the avenues, about 2½ miles north, they are just half a mile apart. At present the Metropolitan road extends no further south than Morris street, and on the opening day, its trains ran no further south than Rector street, just below Trinity Church-yard, the tracks between Rector and Morris serving as a sort of engine-yard. Tuesday an experimental train is said to have run the distance through from Rector street to Central Park, about four miles, in 11¼ minutes, making no stops. But this is no sample of the work practicable on a road of this kind, where stopping and starting absorb about half of the time, and there is hardly room between stations to develop the full speed of the engine. There are on the Metropolitan road, within about 4¼ miles, fifteen stations and four sharp curves, at which right angles are turned within the street. There is an average distance of only about three-tenths of a mile between stations. Last Wednesday the trains timed seemed generally to require 25 to 28 minutes for the trip, going no further down than Rector street. This is very nearly the old time of the New York Elevated road, and not so fast as the time prescribed by a time table which was to go into effect on the latter road on Thursday of this week. However, it would not be fair to judge the Metropolitan by the results of a few trains tried on the day of opening, when all was irregular. It may be said, however, as has been before, that the time was fast enough. People will be well enough suited if they can get from the Battery to Central Park in half an hour. When the road is extended three, four or five miles further, some of the passengers will want to travel faster, but hardly now.

The stations of the new road are, or rather will be when completed, much more roomy and convenient than those of the old one; both companies have established their stations over the streets, buying no land therefor, and running their approaching stair-cases down over and upon the sidewalks. The Metropolitan Company has been made very liberal appropriations of this public property, greatly to its own advantage, and with such damage to streets and sidewalks as will hardly be submitted to again, we imagine, though New Yorkers—especially those who own or occupy no property adjoining the stations—will probably accept the sacrifice cheerfully in view of the benefit. The Metropolitan stations are virtually double stations, one for the up track and one for the down track, without communication between, and often with two wide stair cases on each side. The old New York Elevated stations are served by a single stair-case for both tracks, and that a very narrow one. It has presumed less on the rights of the public in the streets, and has provided its stations with more slender accommodations. A result of the double stations on the Metropolitan road is the necessity of double station crews, which will probably have to be again doubled when the road is worked at night.

The interest in the opening of the new and convenient Metropolitan road with its elegant cars is likely to divert attention from an important addition to the old New York Elevated road which came into use at the same time. This is the double track, now completed to Fiftieth street, which for the first time enables the company to put on as many trains as there may be occasion for, and give an excellent and solid structure on at least one side of the street throughout the length of the road, from the Battery to Fifty-ninth street. Heretofore trains have been run on this road as frequently as was possible, it being necessary to meet and cross at four stations. But aside from this, the capacity of the road for speed has been greatly limited by the lightness and imperfection of the old structure from Morris street to Thirtieth street, which was bought with the franchise by the present company from its bankrupt predecessor. The weight of engines on this part of the structure is limited to eight tons, while thirteen-ton engines will be allowable on the rest of the structure, and will be used on the new east side road which this company is building. Of course no heavier engines can be used on the west side, so long as this old road is used, as it must be still in one direction; and, as we have said, with the present length of road the speed is sufficient. But the road can now be worked, if a few sidings are added, without using the old structure, which can thus be renewed, when the time comes for it, without interrupting the traffic of the road. The new track is very solid, is kept in line, and of course in surface easily, and rides very smoothly. Its completion has enabled the company to run by a new time table, by which in the hours of active traffic—in the morning from 6:20 to 9:35 going up, and from 6:45 to 10 going down; and in the evening from 3 to 6:30 going up, and from 3:30 to 6:55 going down—trains will be run every five minutes. The speed is also increased, the train going down being reduced from 31 to 25 minutes, and going up from 32 to 26. This road is about five miles long, and the effective speed, including stops, is thus made just about twelve miles an hour. Time tables of the Metropolitan Railway in London, examined some time ago, showed an average speed of about 15 miles an hour. That was made with 50-ton engines, while the New York Elevated uses 8-ton engines.

Very satisfactory progress has been made in the construction of this company's railroad on the east side of the city—through Pearl street, the Bowery and Third avenue. At present, with the exception of two gaps, each but a few spans long, the structure is erected from the Battery, where it joins the west side road, to Fifty-eighth street, and the track is laid on most of it. The company hopes to begin running trains to Forty-second street (there will be a branch there to the Grand Central Depot) before August, and there seems good reason for its hope. This line is through a densely peopled district all the way. The stations on it are only about half as far apart as on the west side line and most of the Metropolitan, (from Ninth to Fifty-ninth, just two miles and a half, there will be ten). It is completed as a double-track road at once, and will, consequently, be able to accommodate all the trains the traffic may require.

Altogether, the problem of getting up and down town in New York is already solved for a large part of the city, and sure to be solved very soon for that part of the rest of it which has a considerable population to go up and down. Living in the city is made easier—and living out of it also; for the roads which carry us so quickly up and down also serve as well the people from Brooklyn, Staten Island and the New Jersey towns, some of whom have been accessible enough to down-town but not to up-town New York. The general effect is a material increase of the area within which people doing business in New York will be able to reside conveniently, without cutting themselves off from the social advantages and other attractions of the great city. What effect this will have in drawing people into the city or making them contended in the suburbs, remains to be seen. It is not doubtful, however, that it will make living in either pleasanter and easier, and that is the great thing.

## Western Immigration.

The settlement of Western prairies is a matter of the utmost importance to a great many of our railroad companies, as it is thus only that they can ever hope to have an adequate traffic. For some years past, in spite of the great oversupply of labor in most manufacturing industries, immigration to the West has been comparatively light; there has been no such rush as there was for some ten years before the war to Iowa and Minnesota, and for five or six years after the war to Kansas, Eastern Nebraska and part of Iowa. But this spring the movement has set in again with something like the old vigor; and in nearly all the prairie country, where very cheap prairie land is to be had, great numbers of people come to make new farms. A very good clue to the increase in the movement, though not of its amount, is had by the sales of land by land-grant railroad companies. The *Commercial and Financial Chronicle* compiles the following table of the sales of lands by land-grant railroads during the first four months of the years 1877 and 1878.

| | 1878 | | 1877 | |
|---|---|---|---|---|
| | Acres. | Value. | Acres. | Value. |
| Atchison, Topeka & Santa Fe | ..... | $416,853 | ..... | $79,436 |
| Union Pacific | 108,418 | 545,447 | 9,842 | 36,141 |
| Burl. & Mo. Riv. in Nebraska | 196,091 | 1,048,700 | 8,780 | 55,417 |
| Grand Rapids & Indiana | 15,754 | 239,742 | 6,708 | 67,322 |
| Missouri, Kansas & Texas | 38,541 | 87,032 | 22,131 | 51,500 |
| Flint & Pere Marquette | 4,720 | 39,250 | 2,269 | 18,325 |
| Illinois Central | 4,841 | 32,873 | 2,362 | 18,526 |
| Kansas Pacific | 127,271 | 431,448 | 31,724 | 103,220 |
| St. Paul & Sioux City | 33,226 | 229,556 | 8,500 | 52,500 |
| Sioux City & St. Paul | 22,787 | 141,240 | 6,250 | 40,000 |
| Northern Pacific | 165,564 | ..... | 81,175 | ..... |
| Denver Pacific | 18,500 | 105,000 | 791 | 4,100 |
| Little Rock & Fort Smith | 39,438 | 173,950 | 13,069 | 57,634 |
| St. Paul & Pacific | 162,000 | ..... | 33,000 | ..... |
| Total | 867,151 | $3,991,091 | 26,601 | $584,121 |

The notable thing is not so much the gross amount of the sales as the enormous increase, the quantity sold being *thirty-two and a half times* as great this year as last. It is true that the amount sold is a very inconsiderable addition to the acreage of land occupied (it will be long before this is all cultivated) in the West. It will make but five or six thousand farms of the average size there. But the railroad land sales are in most places but a fraction of the total. In Western Minnesota, for instance, the government lands go

at least as fast as the railroad lands; and we may be sure that when there is a demand for these, the same causes which make such a demand will result in the cultivation of larger and larger areas of the land already purchased by farmers. That is, there is a prospect for a profit in breaking and planting new land, or there is believed to be.

Though the area of very cheap fertile lands in the Northwest is now very restricted, it is evident to every one who merely passes through such districts as Minnesota, Western Iowa and Missouri, not to say Kansas and Nebraska, that there is still an enormous area uncultivated. And the history of the settlement of this country shows that it will be many years before most even of the very desirable land will be cultivated or otherwise utilized except imperfectly as common pasturage. The fact is that the rapid acquirement of a comfortable property in the West has not been so much by making a profit on the crops raised as by an advance in the value of the land purchased. Thousands of men, forty years ago or less, bought prairie land in Illinois at a dollar and a quarter an acre; toiled terribly fourteen or fifteen years on it without making more than a very plain, if abundant, subsistence and the means of subduing part of the soil, making fences and some poor farm buildings; but then found themselves comparatively rich, because what had cost them, improvements and all, perhaps not ten dollars an acre could be sold for twenty or twenty-five. This experience has not been forgotten. The immigrants of to-day are largely, perhaps chiefly, the children of the immigrants of that day. They are not only farmers; they are speculators. Generally they buy more land than they can possibly hope to cultivate,and more than they expect to for years to come. Part only of their land is an instrument of production; the rest is an investment from which no immediate return is expected—a sort of long loan for which compound interest is expected at the end of a term of years, of uncertain duration. Thus we often find half or two-thirds of the land which is actually owned by residents left unbroken for years,sustaining a few cattle perhaps, but hardly to be counted as a source of income to the owner. An immense territory in Iowa is so held, and it is this fact which leaves several of the roads there, such as the Iowa Division of the Illinois Central and the Iowa & Dakota Division of the Chicago, Milwaukee & St. Paul, with such very light earnings, though the country through which they pass is as about fertile as any in America, with scarcely an acre of waste land, and capable of producing as much per average square mile as the best parts of Illinois and Wisconsin.

The development of the land so held will doubtless be much slower than the settlement of the low-priced railroad and government lands; but the activity in the latter is very good evidence that there is more than the usual amount of private lands being brought under cultivation. There are numerous roads west of the Mississippi whose earnings rationally may be expected to double or treble when the fertile land in their vicinity is as generally cultivated as that in Illinois or Wisconsin. The proprietors of these roads, therefore, are very greatly interested in this process of development, and will be much encouraged by any signs that it is making more rapid progress.

## Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:

*Pittsburgh & Lake Erie.*—Extended southeast 7 miles, to a point 12 miles from Youngstown, O.

*Cheraw & Chester.*—Extended eastward to Rich Hill, S. C., 2 miles. It is of 3 ft. gauge.

*Lehigh Valley.*—The *Lost Creek Branch* is extended from Girardsville, Pa., to Ashville, 2½ miles.

*Minnesota Midland.*—Extended from Millville, Minn., west to Zumbrota, 11 miles. It is of 3 ft. gauge.

This is a total of 22½ miles of new road, making 407 miles completed in the United States in 1878, against 461 miles reported for the corresponding period in 1877.

THE TRAVELLERS' OFFICIAL RAILWAY GUIDE, with its June issue, completed its tenth year. This period includes the five years of the most extraordinary activity in railroad building the world has ever seen, followed by five years of what seems, in comparison, great dullness in railroad construction. Of the progress in construction, as also of developments in the formation and destruction of railroad systems—of the consolidation and leasing of roads, and of the bankruptcies and foreclosures which sometimes break up leases—the *Official Guide* itself is one of the best records. Some of the changes within the ten years are noted by the Editor in the June issue, as follows, comparing the *Guide* of this month with that of February, 1869, which is the oldest one in his possession:

"At that date the size of the pages within the rules was four and a half by six inches. The total number of names of railway lines published in the index of roads was 344, representing about 45,000 miles of road—an average of 131 miles to each line. In the present edition there are 577 railway lines named in the index of roads, representing about 80,000 miles—an average of 141 miles to each line. The average length of lines has been materially reduced during the past year by the construction of a large number of short lines and lateral roads, very few of them exceeding thirty miles in length. It is noticeable that of the 344 railways in active operation in 1868-69, but 146 are now being operated under the same title as at that time. All of the remaining number have been reorganized, leased or consolidated with other roads. Two hundred and twenty-four pages (4½×6) served at that date to represent very fully the time schedules of the whole railway system of the country. It now requires 284 pages of a little more than double the former size. The index of railway stations contained the names of 5,495 stations. The present number of stations is 20,128. The official list of officers in charge of the general ticket and passenger departments contained the names of the representatives of 183 lines; the present list names 479 lines. Of this number 34 lines only are now represented by the parties who were in charge ten years ago."

This *Guide* is itself a monument to the vast extent of our railroad system. It has become an enormous volume, in spite of its broad pages and compact printing, and it is impossible to give time-tables for American roads showing all the stations without an enormous volume. And as the bulk of the book must increase with additions to the number of trains on the old roads, as well as with the construction of new roads, and as even at the present slow rate of construction, as we call it, some 55,000 miles will be added to our system by the year 1900, it is not pleasant to think what a formidable *Official Railway Guide* we shall have to carry at that not very distant date, the opening of the twentieth century. And if it is as complete and accurate then as now, we shall hardly know how to get along without it. Certainly to railroad officers, with its official lists of those to whom the reports and returns of the several companies should be directed, as well as its full time and distance tables, it is indispensable.

THE PARTIES TO THE EAST-BOUND APPORTIONMENT are to meet in New York June 11—the very day their agreement expires—to consider matters. There will doubtless be an effort made to extend the agreement or replace it by something of the same general character, but there does not seem to be much expectation that it will succeed. The old one has not been effective enough as an apportionment to be very encouraging, and there are some who do not need much discouragement to lead them to disfavor any further attempts in that direction. They may not be opposed to combinations and divisions of traffic, but they don't put much faith in an agreement that cannot be and will not be enforced by law. Some practicable method of compelling the several parties to a contract to keep it seems to be a desideratum in this matter as is in most human affairs. At present there seems not to be any cutting of rates; but then there is no margin of profit to cut off. There is a large through traffic notwithstanding the heavy lake and canal business; but its chief value seems to be to keep the train-men employed. And the conviction that for the present rates cannot be advanced, under any kind of combination, doubtless has much to do with the reported indisposition to make one. Last year the roads got 30 cents per 100 lbs. from Chicago to New York on grain and fourth-class freight in July and August, and then were able to advance the rate to 35 cents. It certainly seems very strange that now, when there certainly is more to carry, and the vessels are charging more rather than less, the market will not bear a rate higher than 20 cents. It is easy to understand that this may be true of grain, but that it can be of pork products is strange indeed. These have always, or for a great many years, moved chiefly by rail, frequently at 40 or 50 cents per hundred, and generally when the difference in favor of the water rate was much greater than it now is. As things are going, there is no money in through east-bound business, and is not likely to be this summer; and this is particularly exasperating because the roads in the Northwest which carry grain to Lake Michigan are getting an enormous traffic at remunerative rates and making large profits. Just south of them is a great net-work of roads that have hardly anything to hope from their traffic, however great it may be. There ought to be some remedy for this, and the railroad managers ought to try again to find one. Even if rates cannot be advanced this summer, the summer will not last forever, and the time will come when there will be some profit in traffic—if the railroads do not quarrel over it. About that time it will be a good thing to have a combination in good working order.

INDIA WHEAT has recently appeared in the European market as a competition of American and Russian wheat. The amount received is already considerable, but this is not so significant as the rapid increase in the exports. Until 1873 they were next to nothing; then an export duty that had formerly existed was removed, and for 736,000 bushels in 1872-73 the exports increased to 10,500,000 in 1876-77; while from the first ten months of 1877-78 they have been 11,600,000 bushels. And this in spite of Indian famines, which, though not in the wheat-growing districts, have attracted large supplies from them and so reduced the amount available for exportation. There is said to be a large district in India available for wheat growing, which as yet has such very imperfect communications that it is not utilized for that purpose to anything like its full extent. As labor is extremely cheap there, and the railroad system is being gradually extended, so that eventually, no doubt, this country will all be able to market any surplus of its grain, it becomes interesting to know under what conditions this country of Southern Asia will enter into competition with our farmers in the upper Mississippi valley and on the Pacific coast. Singularly enough, the Hindoos in the vicinity of their great grain market seem to be situated much like the farmers in Western Iowa and Minnesota, so far as the cost of marketing their grain, and its consequent price, are concerned. At Cawnpore, in Northwest India, 684 miles by rail from Calcutta, wheat recently was worth 73 cents a bushel; it costs 21 cents a bushel to have it taken to Calcutta, and the rate from Calcutta to England by latest advices was 13 cents—less than from New York to Liverpool, though the distance is more than twice as great. Just now it costs just about as much to send wheat from Minnesota to New York, some 1,500 miles, as from Cawnpore to Calcutta, less than 700 That the Cawnpore price is considered remunerative by the Indian wheat-grower is sufficiently indicated by the rapidly increasing exports from a country which does not grow rapidly like our Western States and has for ages had its industries arranged so as to produce substantially all its supplies and consume all its produces at home. If the Indian railroads come down to the American rates, and carry for 10 cents instead of 20 cents a bushel, the competition of the Indian wheat-growers may be more sensibly felt hereafter in this country.

THE VOTE ON DAILY INDIVIDUAL CAR REPORTS at the late Car Accountants' Convention, which is now first published, is very interesting. There is nothing like the division of sections that had been anticipated. About as many Northwestern roads were in favor of it as against it, and one could almost say that the chief opposition was in the East. Roughly figuring up the mileage represented on either side, we find that the 40 lines voting for this system of reporting had 13,237 miles of road and the 27 voting against it represented 10,837 miles. Besides, *all* the line organizations represented voted for it. The relative importance of the different lines is an important element to be considered. The Glasgow Branch Railroad with 10½ miles of road, which voted aye, and the Traverse City Railroad, with 26 miles, which voted nay, count for as much in the footing as the Chicago & Northwestern, with more than 2,000 miles, or the Chicago, Burlington & Quincy, with more than 1,600. But in this matter the votes ought to be, and will be, weighed as well as counted. The vote is not a decision but a recommendation. It is intended to influence the decision of those in authority, who will doubtless take into consideration the importance of the different lines voting, and the amount and nature of their interest in the matter. It is true that mileage is not a true measure of the relative importance of the lines, nor even traffic or number of cars employed. If any one thing would be, it would be the mileage of cars interchanged. If a statement could be had from each road, showing on one side the mileage of its cars on foreign lines and on the other the mileage of foreign cars on its lines, it would help wonderfully in making an estimate both as to the degree and as to the nature of each company's interest in exact reports.

It must further be borne in mind that the votes in the Association are not always accurate indices of the purposes of the companies. That is, the company has not always instructed its representative at the meeting of the Association, and will not always adopt itself the policy which its Car Accountant favored. It is willing that he should do as he pleases in the convention, but will make him do as it pleases, which is perhaps not as he pleases, in his office. This does very well so long as the meeting is engaged in discussion and the interchange of information; but when it is engaged in trying to effect some unity in action it is very confusing. Then the company and not the individual needs to vote.

THE DANGERS OF RUNNING TRAINS BACKWARD were illustrated last week by accident on the Prospect Park & Coney Island Railroad, although in this case, of course, the accident was not caused by the backing, and the backing was probably unavoidable, as is often the case with construction trains. But though nothing can relieve the miscreants who obstructed the track from the responsibility for the accident and the killing of five of their fellow-creatures, it is still probable that the results of the accident would have been much less serious if the train had been running with the engine ahead. In the first place, with the head-light and the engineman watching the track ahead it is possible that the obstruction might have been discovered in time to arrest the train before striking it; but, at all events, with the engine ahead there would have been, in the first place, less liability of leaving the track, and, in the second place, less probability of injury to the cars and their occupants if the train did leave the track. Actually, it is reported, the locomotive ran over the obstructions, or part of them, without derailment. But with the power behind the cars the derailment of one almost insures the derailment of all that follow, and not only the simple derailment, which at moderate speeds is not always nor even usually fatal to the occupants of the cars, but a piling together and a crushing of the vehicles which is much more likely to injure those who are on them. We have noted heretofore an undue proportion of fatalities resulting from construction trains, for which there are several reasons; but one reason why they are so deadly is because such trains often must be—at least very often are—run backward. Though perhaps most or many of these are inevitable, it is well to bear in mind the great additional danger to a train so run; for it seems not to be sufficiently appreciated, as we hear sometimes of excursion trains being run in that way, when a derailment would be likely to have the most terrible consequences.

FRIGHTENING A PERSON TO DEATH will render a railroad company liable for damages, according to a decision of courts of the German Empire. A railroad passed through a little town in the rear of some houses, with only a very little garden between the road and the backs of the houses. While the wife of a veterinary surgeon was engaged in her kitchen at the rear of one of these houses a train ran off the track, and three or four cars came tumbling over each other in this little back yard within a few feet of the woman, who thought her house was tumbling down about her ears, and of course was terribly frightened. She was pregnant, and her fright caused premature labor, followed by disease of which the woman died—all reasonably due to the fright occasioned by the accident. The railroad company was sued for $10,000 damages in causing the death of the woman. It pleaded that it was only liable for injuries caused physically by the accident; that if the cars had fallen on the woman and crushed her they would have been liable, but that as she was not touched by the wrecked cars they were not liable. The courts, however—and the case was carried from one to an-

other on appeal up to the Superior Commercial Court—all decided that under the Imperial law with regard to responsibility for accidents the railroad company was just as liable as if the cars had run over the woman.

THE BROTHERHOOD OF LOCOMOTIVE ENGINEERS reported very few expulsions in the May number of it's *Journal*. In the June number 68 expulsions are chronicled, 44 of which are from Division No. 157, (Communipaw, N. J.) and the *Journal* gives the names of those who did not sign the agreement "to voluntarily withdraw from the Brotherhood" on the Central of New Jersey. The number of these is only nine. But the following have disappeared from the list of divisions since the publication of the April number:

| | |
|---|---|
| No. 2 | Jackson, Mich. |
| No. 3 | Michigan City, Ind. |
| No. 8 | Alliance, O. |
| No. 44 | Altoona, Pa. |
| No. 80 | Renovo, Pa. |
| No. 128 | Meridian, Miss. |
| No. 131 | Augusta, Ga. |
| No. 154 | Hampton Junction, N. J. |

There are now 34 blanks in the old list of 192 divisions, most of which have been made within the past year. The last reported number of members of the insurance association of the Brotherhood is 1,937, who are assessed one dollar each for every death, and two assessments are called for in the June *Journal*. The number of members June 30, 1877, was 3,064. Thus the present members receive less than two-thirds as much insurance as those who died a year ago.

THE AUDITOR OF PACIFIC RAILROAD ACCOUNTS proposed by Mr. Thurman in the Senate, is a natural requirement of the relations of the Government to these railroads. It is entitled to a certain proportion of their net earnings, and, consequently, it should be enabled to ascertain through its own agents what those net earnings are—what are the receipts and what the disbursements, in order that it may know whether what is charged to expenses really belongs under that head, and that it may get its just dues. This officer, if the bill passes, apparently will have duties similar to those of the English railroad auditors, who have nothing to do with the keeping of the accounts, but simply examine them and certify as to their correctness.

# Contributions.

## Railroad Bridge Accidents.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Upon returning to my office after an absence of six weeks in the State of Maine, I find in your paper for April 5, 1878, a criticism upon my paper on "Railroad Bridge Accidents,' signed "A. M. W." I must plead guilty to the charge of faulty arithmetic in the instance cited. After the article was written I received additional information in regard to several accidents which reduced the number of bridges of "unknown" material, and I corrected the table accordingly, but overlooked the statement he complains of. It seems that out of 117 accidents where the material of the bridges was known, 57 occurred upon pile or trestle bridges and 60 upon truss bridges. So that my statement should have been *nearly* "one-half the number," etc., instead of "more than one-half the number," etc., as written. Still that slight error does not weaken the point which I wished to make, that accidents upon trestles are of frequent occurrence.

"A. M. W." also says: "But it is also to be remembered that at least 50 out of the 66 bridges of 'unknown' character were probably truss bridges, it being quite uncommon to describe trestles unqualifiedly as a 'bridge.'" Doubtless it is quite uncommon among engineers to call a trestle a bridge, but the average newspaper reporter includes cattle guards, trestles, truss bridges of wood or iron, and stone arches, all under the one comprehensive title, "bridge." As the accounts of accidents from which my original data were obtained were taken from the local newspapers, it is extremely uncertain what the character or material of the bridges was. However, to judge from the experience I had in getting information regarding the other accidents, I should say it is more probable that 50 out of the 66 unknown bridges were trestles than as "A. M. W." assumes. At all events it is better to drop the "unknown" bridges from the calculations entirely rather than hazard a guess upon their character, and thereupon build an argument.

I am well aware that a large proportion of the railroad bridging of this country is built upon the pile or trestle plan; but I believe, as my critic suggests, that the number of "trestle train miles" is probably much less than the number of "truss train miles," because in the Southern and Western States, where the trestle is so largely used, the number of trains is comparatively small, while upon the older roads doing a large business the trestle is being rapidly replaced by other styles of bridge or solid filling. But the trouble is not with new or "well constructed" and carefully repaired trestles, it is the old, low, neglected trestles, with short, unsecured cross-ties, that make the mischief. A good substantial flooring is just as important upon a trestle as on any other bridge. But trestles, unless of exceptional height, rarely receive the attention and repair that truss bridges do. The latter are closely watched and carefully repaired by competent mechanics, while the former are too frequently left to the tender mercies of the section hands, who never look at anything beyond rails and sleepers. Hence I insist that the average trestle is dangerous.

In regard to the comparative cost of Howe truss and iron bridges, I hope it is a fact, as my friend suggests, that a higher standard for Howe truss bridges prevails in the West than that of New England, for I am well aware that the Howe trusses of this region are lamentably weak. For iron bridges of moderate span, say 120 feet, it is common practice hereabouts to assume a rolling load of 3,000 lbs. per linear foot of track in addition to weight of bridge and track, and to allow 10,000 lbs. per square inch maximum tension strains, with other strains in proportion. Now, for a Howe truss bridge "of equal strength," I should allow the same figures for live load and tension strains upon the rods, allowing for the depth of screw-thread if the rods were not upset ends, and 800 lbs. per square inch *net section* of bottom chords, and compression strains in like proportion. I have seen bids for iron and Howe truss bridges, for the same spans, in which the iron bridges cost 27 per cent. more than wooden ones. But while the iron bridges were designed in accordance with the above figures, the Howe trusses, under the same load, would have strains of 20,000 to 26,000 lbs. per square inch in the iron, and 1,200 to 1,800 lbs. per square inch in the bottom chords. That is the kind of Howe truss bridge we get in this vicinity, and what the iron bridges have to be compared with. If they build better ones in the West, I am glad to know it, and should like to see their *actual cost* compared with the cost of iron bridges designed according to the above data. I have never seen a Howe truss that I should consider of equal strength with a modern iron one, although there may be plenty of them in the country.

T. APPLETON.

No. 11 Pemberton square, BOSTON, May 31, 1878.

## The Problem of the Trains.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Let $x$ = length of road in miles, then:

$\frac{x}{m}$ = freight train's time to pass over road.

$\frac{x}{n}$ = mail " " " " "

$\frac{m}{2}$ = speed of freight train after the detention.

$\frac{x}{m} - \frac{x}{n}$ = difference in time of starting.

From the above data we have the following equation:

$$\frac{\frac{2}{3}x}{m} + \frac{(x-a)-\frac{2}{3}x}{\frac{m}{2}} = \frac{x}{m} - \frac{x}{n} + \frac{x-a}{n},$$

which expresses the relation between times of the trains up to the point of collision. Clearing and transposing, we find:

$x = 6a - 3a\frac{m}{n}$ = length of road.

Substituting this value of $x$ in the expression $\frac{x}{m} - \frac{x}{n}$, we find for the difference in times of departure of trains,

$$\frac{3a(2n-m)}{mn} - \frac{3a(2n-m)}{n^2}$$

L. P. T.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Noticing in your last issue a rather complicated, though correct, solution to a problem given in your issue of May 24, I beg to hand you the following:

If $x$ = length of the road and $m$ = speed of freight train, in miles per hour, and $n$ = speed of express train, in miles per hour, the time the freight train takes to perform the journey, less the time the express train takes will equal the time that the freight starts before the express *i. e.*:

$$\left[\frac{x}{m} - \frac{x}{n} = y\right];$$

and in the second case, taking the time each takes to get to point of collision 1 mile from the terminus, in the same way,

$$\left[\frac{\frac{2x}{3}}{m} + \frac{\frac{x}{3}-1}{\frac{m}{2}} - \frac{x-1}{n} = y\right].$$

Therefore:

$$\frac{x}{m} - \frac{x}{n} = \frac{\frac{2x}{3}}{m} + \frac{\frac{x}{3}-1}{\frac{m}{2}} - \frac{x-1}{n}$$

The result of such equation is

$$x = 6 - \frac{3m}{n},$$

and putting this value for $x$ in my first equation, $y$ will be found to equal

$\frac{6n^2-9mn+3m^2}{mn^2}$ = the start which the freight gets in hours.

These results are similar to Mr. Shanahan, except that he has put the letter "$a$" in place of one mile, which is the distance given from the point of collision to the terminus.

H. J. MARKHAM.

## Laying Rails to "Break Joints"—Grass and Weeds on the Track.

TO THE EDITOR OF THE RAILROAD GAZETTE:

There are not a few engineers and roadmasters who entertain the idea that much good results from laying rails to "break joints;" that is, bringing the joint on one side of the track opposite the middle of the rail on the other. There may be something good in the plan, but the advantages are slight, and the plan is, on the whole, objectionable. Probably the idea of laying rails in this manner originated from the fact that carpenters, masons, bridge-builders, ship-carpenters and others, strengthen their works by breaking joints; and, in fact, without the use of this method in some form no structure could be make to stand. There is no end to the ways in which it is applied by mechanics and engineers. In some instances it is absolutely indispensable, and in others it is used as being preferable to other methods, as in laying floors, boarding roofs, etc. It is hardly correct to reason that because it strengthens a bridge to break joints with the timbers, a track would be benefited in the same manner by breaking joints with the rails. In placing a series of timbers together they can be so placed in relation to each other that there is a mutual support and the weak points are strengthened. Of course a track would receive a like benefit under similar conditions; but while, in most instances, to break joints gives greater strength vertically, laterally and longitudinally, the only increase of strength (if any by laying rails to break joints) is laterally. A joint certainly has no more strength vertically by being laid opposite the middle of the opposite rail than if laid on the same tie with the other joint, and with some of the joint fastenings now in use the rail is capable of resisting as great a lateral force at the joint as in the middle. Take a 30 ft. rail and lay it on smooth ties. Spike the ends of the rails and note the force required to spring the rail to a curve in the middle. Then take two 15 ft. rails and make a joint with some of the griping devices in use, and fasten the coupled rails at the ends as with the other. Apply force enough at the joint to curve the rail (calling it a whole rail), and you will discover a greater lateral resistance at the joint than in the middle of the whole rail. Our rail joint fixtures are not yet perfect, but so far as lateral "stiffness" is concerned, there are various devices that "fill the bill" when kept in order. Therefore, in preparing a track to resist lateral strain, there is nothing gained by the plan of breaking joints. On the contrary, there is much to be lost; for, although joints may be made strong enough laterally, yet it is the weakest part of the rail, and is lacking in vertical resistance. If the ties were laid on sub-sills we could then break joints to some purpose; that is, by putting the ends of the sub-sills under the middle of the rails the rail-joints would get the support of the middle of the sub-sills, and the rails be kept in surface without much trouble.

Perhaps the most disagreeable and unprofitable track ever laid was with the joints opposite the middle of the opposite rail. Owing to the difficulty of keeping the joints up to a good surface it imparts a rocking motion to cars and locomotives that is at once disagreeable, destructive and unsafe. First the right wheel drops into a low joint, then the left; and if the track is rather rough, one riding in an empty box car will experience a sensation similar to that in riding in a cart over a paved street pretty well sprinkled with loose paving stones. Low joints opposite smooth centres chop up the oscillations, making a cross between a vertical and a lateral, a sort of half gallop and half stagger, one motion suddenly interrupted by another in a different direction, and all the "poetry of motion" is destroyed. It would seem as though the whole train had the hiccoughs, the St. Anthony's dance, and the blind staggers, and was trying to run away diagonally across a potato field. If the joints of a track laid to break joints are very low, it is intolerable, and injures rolling stock at a fearful rate, and unless the surface is absolutely perfect, it is a bad track. There are but few roads in this country so well kept that a track laid with broken joints would not be a miserable one. Some roads have their curves laid in this manner, thinking they can the better be kept in line, and that the rails are less likely to spread than if laid with even joints. This is a fallacy, and there is nothing better to keep the track in line, and from spreading, than good ties, and enough of them; the rails properly curved and spiked and laid to a proper incline, and enough good ballast. With these materials properly used, and the rails laid with even joints, there should be no trouble, provided always that the moguls and consolidations are kept off the road. There are those who believe that it is better to lay track on the plan under consideration, but as it is no stronger, either laterally or vertically, and can give no greater resistance to forces in any direction than even joints, and is far more injurious to rolling stock, and more unsafe and disagreeable when in a bad condition than an even-joint track, it is preferable to lay to *even* joints on tangents, and as near radial as possible on curves.

WM. S. HUNTINGTON.

# General Railroad News.

## MEETINGS AND ANNOUNCEMENTS.

### Dividends.

Dividends has been declared as follows:

New York, New Haven & Hartford, 5 per cent., semi-annual, payable July 1. The transfer books will be closed from June 4 to July 5, both days inclusive.

Fitchburg, 3½ per cent., semi-annual, payable July 1.

### Railroad Conventions.

The twelfth annual meeting of the *Master Car-Builders' Association* will be held at Niagara Falls, N. Y., beginning Wednesday, June 12.

### Foreclosure Sales.

The *New Orleans, Mobile & Texas, Western Division*, was sold in New Orleans, May 31, under order of the United States Circuit Court. Bought for $350,000 by L. H. Ferry, who represents a committee of the bondholders. The sale included the completed track from Westwego, opposite New Orleans, to Bayou Goula, 65 miles, and the partly graded road-bed thence to Vermillionville, some 60 miles. The graded road-bed and right of way west of Vermillionville was excepted from the sale on petition of Morgan's Louisiana & Texas Company, which has begun proceedings to condemn them for its own use. The property was sold several years ago, but all efforts to reorganize have been unsuccessful.

## ELECTIONS AND APPOINTMENTS.

*Alabama Great Southern.*—This name replaces that of the Alabama & Chattanooga, but the old officers continue as follows: Agent and General Manager, John Swann; General Superintendent, Col. Chas. P. Ball; General Freight and

Passenger Agent, R. A. Bacon; Treasurer, W. H. Mims. Offices at Chattanooga, Tenn.

*Atchison, Republican Valley & Pacific.*—The officers of new company are as follows: President, Charles Gulick, Scandia, Kan.; Vice-President, S. Morland, White Rock, Kan.; Secretary, W. E. Reid, Concordia, Kan.; Treasurer, Thos. Wolfert, Scandia, Kan. The company is organized in the interest of the Central Branch, Union Pacific.

*Brattleboro & White Hall.*—Mr. W. A. Haven, of Rochester, N. Y., has been appointed Chief Engineer.

*Canada Southern.*—At the annual meeting in St. Thomas, Ont., June 5, the following directors were chosen: Wm. H. Vanderbilt, Cornelius Vanderbilt, Augustus Schell, Samuel F. Barger, E. D. Worcester, Sidney Dillon, J. Tillinghast, Wm. L. Scott, E. A. Wickes.

*Central, of New Jersey.*—At a meeting of the board, held May 31, E. S. Barnes, G. G. Haven and Frederick A. Potts were chosen directors, in place of Henry Lewis, Richard J. Dobbins and Franklin A. Comly, resigned The new directors are chosen as representatives of the consolidated bondholders; the retiring directors are all Philadelphia men, Mr. Comly being President of the North Pennsylvania.

The board selected John S. Kennedy, J. Edgar Johnston and J. D. Vermilyea as trustees under the new mortgage.

It is reported that Receiver Lathrop is to be chosen President of the company.

*Chesapeake & Ohio Canal.*—At the annual meeting in Annapolis, Md., June 3, Hon. A. P. Gorman was reëlected President, with the following directors: M. Bannon, James G. Berrett, B. B. Crawford, H. D. Farnandis, P. Hamill, John Humbird. The board elected B. F. Fawcett Secretary.

*Chicago, Burlington & Quincy.*—The following changes are reported, taking effect June 1: The Quincy Division is consolidated with the Galesburg Division, Superintendent H. Hitchcock taking charge of both divisions. Mr. N. D. Munson, late of the Quincy Division, will have charge of the company's business at Hannibal. Mr. James R. Ballantine will be Trainmaster at Quincy, under D. J. Chase, Master of Transportation at Galesburg.

Mr. Robert Colville, for several years past Foreman of the Aurora round-houses, is appointed Master Mechanic at Galesburg. Mr. Frank A. Chase, late an engineman on the road, succeeds Mr. Colville as Foreman of the round-houses at Aurora.

*Chicago, Clinton & Western.*—Mr. B. T. Lewis has been appointed General Ticket Agent, in place of A. Pickard, resigned.

*Chicago, Rock Island & Pacific.*—At the annual meeting in Chicago, June 5, the directors whose terms expired were reëlected, as follows: H. H. Porter, Chicago; Jay Gould, Francis H. Tows, C. R. Marvin, New York. The board reëlected Hugh Riddle, President; David Dows, Vice-President; Francis H. Tows, Secretary and Treasurer; Hugh Riddle, David Dows, F. H. Tows, C. R. Marvin, W. L. Scott, Executive Committee.

*Columbus, Chicago & Indiana Central.*—At the annual meeting in Columbus, O., June 5, the following directors were chosen: J. N. Converse, John S. Newman, Omar Newman, of Indiana; John Gardner, Wm. Jamieson, B. E. Smith, Ralph D. Smith, of Ohio; J. T. Thomas, Philadelphia; Adrian Iselin, John Bloodgood, F. R. Fowler, J. W. Kirk, Henry Morgan, Alexander Taylor, Jr., J. B. Thompson, New York.

*Concord.*—At the annual meeting in Concord, May 28, the following directors were chosen: Onslow Stearns, Concord, N. H.; James W. Johnson, Enfield, N. H.; Joseph P. Pitman, Laconia, N. H.; Samuel N. Bell, Frederick Smyth, Manchester, N. H.; John A. Burnham, J. Thomas Vose, Boston. The board subsequently met and elected Onslow Stearns President; Joseph W. Fellows, Clerk.

*Concord & Claremont.*—At the annual meeting in Concord, May 29, the following directors were chosen: D. M. Johnson, Claremont, N. H.; Dexter Richards, Newport, N. H.; Mason W. Tappan, Bradford, N. H.; Albert M. Shaw, Lebanon, N. H.; Onslow Stearns, Charles Minot, Charles P. Sanborn, Concord, N. H.

*Dallas & Wichita.*—Mr. W. Harris has been appointed Receiver by the United States Circuit Court, on application of the Kansas Rolling Mill Co., which holds all the bonds. He has appointed Dr. Calder Manager of the road.

*Dubuque Southwestern.*—Mr. D. A. Olin has been appointed General Superintendent, and Fred. Wild General Freight and Ticket Agent, with offices at Racine, Wis. Both gentlemen hold the same positions on the Western Union Railroad, in connection with which the Dubuque Southwestern is now worked.

*East Alabama & Cincinnati.*—Mr. R. J. Thornton has been appointed Receiver, and has his office at Opelika, Ala.

*East River Bridge.*—The trustees have reëlected Henry C. Murphy President and Arthur Leary Vice-President.

*Galveston, Harrisburg & San Antonio.*—Mr. James Converse, Chief Engineer, has been appointed Superintendent in place of A. W. Dickinson, resigned, with office in Houston, Texas. Mr. Converse had charge of construction for several years, while the road was being extended to San Antonio.

*Green Bay & Minnesota.*—The new board has elected E. F. Hatfield, Jr., President. His office is at No. 52 Wall street, New York.

*Hannibal & St. Joseph.*—In view of the many recent changes on this road, the following list of the present officers may be serviceable: President, Wm. Dowd; Vice-President, W. B. Leonard; Secretary, J. A. Hilton; Treasurer, W. J. Hilton; General Manager, John B. Carson; General Freight Agent, W. H. McDoel; General Passenger and Ticket Agent, T. Penfield; Auditor, E. B. Easton; Superintendent of Motive Power, G. B. Simonds; Superintendent of Car Department, J. Townsend; Land Commissioner, I. E. Eaton; General Traveling Agent, J. A. S. Reed. The offices of the President, Vice-President and Secretary are at No. 78 Broadway, New York; of the General Traveling Agent, at No. 59 Clark street, Chicago; of all the other officers at Hannibal, Mo.

*Kentucky Central.*—At the annual meeting in Covington, Ky., May 28, the following directors were chosen: George H. Pendleton, J. W. Stevenson, William Ernst, Elliott H. Pendleton, Robert B. Bowler, Charlton Alexander, Peter Zinn.

*Manchester & Ashburnham.*—At the annual meeting in Manchester, N. H., May 29, the following directors were chosed: Samuel R. Payson, Edmund Dwight, John C. Palfrey, Joseph Stone, Person C. Cheney, David Cross, Hiram K. Slayton.

*Manchester & Lawrence.*—At the annual meeting in Manchester, N. H., May 31, the following directors were chosen: Edward A. Abbott, George R. Fowler, Benjamin F. Martin, Nathaniel Parker, Joseph W. Smith, Ezekiel A. Straw, Wm. A. Tower. The board reëlected Ezekiel A. Straw, President; S. N. Bell, Clerk; George B. Chandler, Treasurer.

*Michigan Central*—Mr. Benjamin McClure has been appointed Treasurer.

*Missouri, Kansas & Texas.*—Mr. F. A. Wann is appointed General Eastern Agent, in charge of the freight and passenger business in the East, with headquarters at No. 417 Broadway, New York.

*Nashua & Lowell.*—At the annual meeting in Nashua, May 29, the following directors were chosen; J. G. Graves, J. W. White, W. W. Bailey, F. A. McKean, Nashua, N. H.; H. P. Watts, Manchester, N. H.; Wm. A. Tower, Lexington, Mass.; F. A. Brooks, Boston; Clerk, O. C. Moore, Nashua, N. H.; Treasurer, C. V. Dearborn, Nashua, N. H. Mr. Watts is a new Director, succeeding Mr. Richardson, Mr. Moore has been elected over E. P. Emerson, who has been clerk of the corporation for 15 years.

*Nashua & Rochester.*—At the annual meeting in Nashua, N. H., May 30, the following directors were chosen: F. H. Kinnicut, C. H. Waters, N. V. Whitehouse, J. C. Eastman, F. A. Dewey, C. E. Whiting, E. B. Stoddard, C. W. Smith, C. S. Turner, A. W. Sawyer, A. H. Dunlap, George R. Westcott, J. C. Burley, B. Wallace, W. H. Cook; Clerk, A. F. Stevens. The road is leased to the Worcester & Nashua.

*New York Central & Hudson River.*—At the annual meeting in Albany, June 5, the following directors were chosen: Wm. H. Vanderbilt, Cornelius Vanderbilt, Wm. K. Vanderbilt, Frederick W. Vanderbilt, Augustus Schell, Samuel F. Barger, Joseph Harker, Chauncey M. Depew, John E. Burrill, James H. Rutter, New York; G. J. Whitney, Rochester, N. Y.; James M. Marvin, Saratoga Springs, N. Y.; Chester W. Chapin, Springfield, Mass. Inspectors of elections, Sidney F. Fairchild, Henry Roseboom, Francis S. Pruyn.

The following directors were also chosen for two subordinate lines owned: *Junction*—Wm. H. Vanderbilt, Cornelius Vanderbilt, Wm. K. Vanderbilt, F. W. Vanderbilt, A. Schell, S. F. Barger, E. D. Worcester, J. Tillinghast, J. Harker, C. M. Depew, J. H. Rutter, J. M. Marvin, G. J. Whitney. *Syracuse Junction*—Wm. H. Vanderbilt, C. Vanderbilt, F. W. Vanderbilt, W. K. Vanderbilt, A. Schell, S. F. Barger, E. D. Worcester, J. Tillinghast, C. H. Fisher.

*Northern (New Hampshire)* —At the annual meeting in Concord, May 30, the following directors were chosen: Onslow Stearns, Josiah Minot, Concord, N. H.; George W. Nesmith, Franklin, N. H.; John A. Burnham, Uriel Crocker, Francis B. Hayes, Edward Lawrence, Boston. The board elected Onslow Stearns, President; Wm. L. Foster, Clerk; Josiah Minot, Treasurer.

*Pacific Mail Steamship Co.*—The new board has elected Capt. D. S. Babcock President; Capt. John Riley, Vice-President.

*Pennsylvania Company.*—Mr. Clifford S. Sims has been elected Secretary, in place of C. P. Mackie, resigned. The office will be, as heretofore, at No. 233 South Fourth street, Philadelphia.

*Pittsburgh, Cincinnati & St. Louis.*—Mr. Clifford S. Sims has been elected Secretary, in place of C. P. Mackie, resigned. The office will be, as heretofore, at No. 233 South Fourth street, Philadelphia.

*Portland, Saco & Portsmouth.*—At the annual meeting in Kittery, Me., June 3, the following directors were chosen: John B. Brown, Wm. H. Y. Hackett, George E. B. Jackson, George P. King, Samuel P. Lawrence, Alfred P. Rockwell, S. Lathrop Thorndike. The road is leased to the Eastern Company.

*St. Cloud, Grantsburg & Ashland.*—The first board of directors of this new company is as follows: August Cassel, Wood Lake, Wis.; John Swenson, Trade Lake, Wis.; Canute Anderson, I. Grettum, Andrew Ahlstrom, W. E. Talboys, Grantsburg, Wis.; John Comstock, J. M. Whaley, Hudson, Wis.; John Fleming, Marshland, Wis.; George Badger, O. Cook, Ira Griffin, Oshkosh, Wis.

*St. Louis, Alton & Terre Haute.*—At the annual meeting in St. Louis, June 3, the following directors (one-third of the board) were chosen for three years: W. B. Cutting, Thomas Denney, John S. Barnes, John M. Burke, Anthony Gilkeson. Messrs. Burke and Gilkeson are new directors, succeeding Robert Bayard, deceased, and Hon. Samuel J. Tilden. The board elected W. B. Cutting President, in place of Robert Bayard, deceased, and reëlected George W. Parker Vice-President and Treasurer; E. F. Leonard, Secretary.

*Toledo, Peoria & Warsaw.*—Mr. W. F. Merrill is appointed Chief Engineer and Superintendent, in place of F. N. Finney, resigned. The appointment will take effect July 1.

*Wabash.*—Mr. T. L. Dunn, late Resident Engineer of the Western Division, having resigned, General Superintendent Andrews has issued an order assigning to C. H. Chappell, Superintendent of the Western Division, the charge of the track and the distribution and inspection of ties and fuel, and to Mr. Samuel B. Ives, Assistant Engineer, the charge of the bridging, buildings and fixtures, water works and other engineering duties.

*Whitewater.*—The first board of directors of this company, organized by the purchasers of the Whitewater Valley road, is as follows: Elijah Smith, Edmund Dwight, S. W. Richardson, J. S. Fay, Henry Parkman, R. L. Read, J. J. Emery, Charles W. Short, Henry C. Kimble.

*Wilton.*—At the annual meeting in Nashua, N. H., May 29, the following directors were chosen: S. Spaulding, J. A. Spaulding, C. C. Boutwell, W. Ramsdell, J. Reed; Clerk, J. T. Greeley. The road is leased to the Nashua & Lowell.

*Wisconsin Central.*—At the annual meeting in Milwaukee, May 30, the three directors whose terms then expired were reëlected, as follows: Matthew Wadleigh, Stevens Point, Wis.; H. L. Palmer, Milwaukee; Samuel Gould, Boston. The board elected Charles L. Colby President and Treasurer; E. H. Abbott, Vice-President and Secretary.

Mr. F. N. Finney has been appointed General Manager, to take effect July 1. Mr. Finney has been Chief Engineer and Superintendent of the Toledo, Peoria & Warsaw for three years past, and was previously General Superintendent of the Logansport, Crawfordsville & Southwestern. He was also Chief Engineer of the Canada Southern during its construction.

## PERSONAL.

—Mr. O. F. Davis, long the General Land Commissioner of the Union Pacific, and Mr. Webster Snyder, the first General Superintendent of the road, have entered into partnership as land agents and opened an office in Omaha.

—The will of the late Charles Morgan was admitted to probate in New York, June 3. It is extremely short, reading as follows:

"I, Charles Morgan, of the City of New York, make this my last will and testament. I appoint my wife, Mistress Mary Jane Morgan, to be my executrix. All my property, real and personal, is hereby given, devised, and bequeathed as provided by the laws of the State of New York in cases of intestacy."

Under the provisions of the will and the law Mr. Morgan's widow will have one-third of the estate, and the other two-thirds will be divided in five shares, of which the three surviving children, Mrs. Whitney, Mrs. Quintard and Richard J. Morgan will each have one, the other two going to the heirs of two deceased children.

—Mr. Jethro J. McCullough, a well-known iron manufacturer, died suddenly of apoplexy, in Philadelphia, May 25. Mr. McCullough was born in Cecil County, Md., in 1809. His first venture in the iron business was at the Newport Rolling Mills, and afterward he established mills at Rowlandsville and North East, in Cecil County, Md., the Diamond State and McCullough Iron Works in Wilmington, Del., and the Galvanized Iron Works, of Philadelphia.

—Mr. H. B. La Rue, for many years General Traveling Agent of the Baltimore Car Wheel Co., has been appointed also General Traveling Agent for the Brooks Locomotive Works and the Midvale Steel Works. Mr. La Rue was formerly for some 15 years in the service of the Erie Railway.

—Mr. Mancel Talcott, a prominent Republican politician of Chicago, died June 5. He was a director of the Grand Rapids & Indiana Company.

—Mr. Junius Flagg, Chief Engineer of the Canada Southern road, died at St. Thomas, Ont., June 4. His body was sent to Toledo, where the funeral will take place.

—Mr. Hardenbergh, of Jersey City, in a speech in Congress, a few days since, on the Army bill, said: "New Jersey in all her action is conservative. The spirit which controls my people is not born of revolution. In the trying times of the past year, when the spirit of disorder was rife throughout the land, we sought not the strong arm of government but the kindly counsels of conservative men, and by them, all danger was disarmed. To have invoked the army to our midst would have invoked disorder and disaster. The faithful, energetic action of one man above all others, who had won his own way from hard-earned toil to a position of high trust, George W. Barker, by his sympathy with labor and his devotion to its interest for many years, was of more avail than would have been ten regiments of armed men; and my city gave to him an ovation of which a conqueror might be proud. He had conquered, but it was a conquest of the heart. Freemen want not bullets, but arguments, not monopolied power, but the spirit of kindness and a generous devotion to their interests on the part of legislation."

—Mr. Collins, Mechanical Engineer of the Pennsylvania Railroad, and Mr. Cloud of the Locomotive Department at Altoona, will leave shortly for Europe. They are sent by the company for the purpose of studying European practice in the construction and management of locomotives, and comparing it with American practice. They will remain abroad some time.

—Mr. Willard W. Fairbanks, for many years connected with the Taunton Locomotive Works, and later with the Grant Locomotive Works, died at his residence in Paterson, N. J., June 4, after a short illness. Mr. Fairbanks had been out of business for some years past; he was 75 years old, but still an active man.

—The Governor of New Jersey has appointed as Deputy Quartermasters General of the State National Guard, Bird W. Spencer, who is Treasurer of the New York, Lake Erie & Western, and James S. Yard, who is State Commissioner of Railroad Taxation.

## TRAFFIC AND EARNINGS.

### Pork Shipments by the Mississippi.

The Chicago *Inter-Ocean* says:

"Several of our Chicago packers, desirous of breaking the rail rates, send their pork to St. Louis now by water, which is bringing the canal and river into prominence as a competing route."

### Grain Movement.

For the week ending May 25 receipts and shipments of grain of all kinds have been reported as follows, in bushels, for the past five years:

At the eight Northwestern markets the receipts were:

| 1878. | 1877. | 1876. | 1875. | 1874. |
|---|---|---|---|---|
| 5,929,890 | 2,294,405 | 3,286,744 | 2,765 782 | 5,970,562 |

The receipts this year are 158 per cent. greater, but were slightly exceeded in 1874.

The total shipments of the same markets were:

| 1878. | 1877. | 1876. | 1875. | 1874. |
|---|---|---|---|---|
| 4,907,025 | 2,330,304 | 3,567,864 | 2,782,468 | 3,695,353 |

The shipments this year are 110 per cent. greater than last year, and much greater than in any previous year.

The portion of these shipments which went by rail and its proportion of the whole totals were:

| 1878. | 1877. | 1876. | 1875. | 1874. |
|---|---|---|---|---|
| 1,957,051 | 794,342 | 1,820,456 | 1,003,242 | 956,626 |
| 40 p. c. | 34 p. c. | 51 p. c. | 36 p. c. | 26 p. c. |

The amount shipped by rail this year is greater than for any corresponding week, though the proportion of the total is less than in 1876. The rail shipments for this week are the largest since navigation opened.

The receipts at the seven Atlantic ports for the week were:

| 1878. | 1877. | 1876. | 1875. | 1874. |
|---|---|---|---|---|
| 6,117,077 | 3,506,828 | 5,316,506 | 2,661,075 | 3,526,682 |

The receipts this year are 42¾ per cent. greater than last year, and 15 per cent. greater than in 1876. The receipts this year have very seldom been exceeded, but they are a little less than those of the preceding week. Of the receipts of the week this year, 44.6 per cent. arrived at New York, 19.7 at Philadelphia, 14.3 at Baltimore, 11.3 at Montreal, 6.4 at Boston, 3.6 at New Orleans, and 0.1 at Portland. In amount both the Philadelphia and Baltimore receipts are very large. Baltimore's have been exceeded but once this year, and Philadelphia's but once in its history. In spite of this, New York has received more than its average proportion of the grain, though not so large a proportion as for three weeks previous. Receipts and shipments of grain at Buffalo, by rail and by water, for the month of May are reported as follows:

| *Receipts:* | 1878. | 1877. | Increase. | P. c. |
|---|---|---|---|---|
| By lake | 9,444,878 | 6,167,780 | 3,277,098 | 53.1 |
| By rail | 2,688,300 | 1,284,400 | 1,403,900 | 109.3 |
| Total | 12,133,178 | 7,452,180 | 4,680,998 | 62.8 |
| *Shipments:* | | | | |
| By canal | 8,801,927 | 3,793,200 | 5,008,727 | 131.8 |
| By rail | 1,780,321 | 1,130,876 | 649,445 | 57.5 |
| Total | 10,582,248 | 4,924,076 | 5,658,172 | 115.0 |

The canal was open 31 days of the month this year and 24 days in 1877; and the average daily shipments by canal were 283,938 bushels this year, against 158,050 last year.

The shipments by rail given above, however, are only

shipments of grain arriving by lake (nearly all by propeller lines, and contracted through "by lake and rail.") Substantially the whole amount received by rail was also shipped by rail, in addition to the rail shipments noted above. Or rather, what is reported above as received by rail was nearly all grain in transit which simply passed through Buffalo on its way to the East. Including this, it would appear that this year about 3,780,000 bushels out of a total of 12,580,000 shipped from Buffalo in May this year, or 30 per cent., went by rail, against 2,415,000 bushels out of 6,200,000 bushels, or nearly 39 per cent., last year. The average daily shipments by rail and by canal were thus:

| | 1878. | 1877. | Increase. | P. c. |
|---|---|---|---|---|
| By rail | 121,935 | 77,903 | 44,032 | 56.5 |
| By canal | 283,933 | 158,050 | 125,883 | 79.7 |

The relative increase by lake and by rail cannot be properly judged without taking into consideration the longer period that the canal was open this year. For the whole season since the canal was opened, the canal shipments from Buffalo to the end of May are as follows:

| | Total. | Per day. |
|---|---|---|
| 1878 (47 days) | 13,007,285 | 276,750 |
| 1877 (24 days) | 3,793,200 | 158,050 |
| Increase | 9,214,085 | 118,700 |
| Per cent. of increase | 242.5 | 75.1 |

The canal traffic, however, has probably not equaled the capacity of the stock of boats now existing. Last October, when the shipments were nearly the largest ever known, the average daily shipments were 319,185 bushels, against 283,933 last May.

Receipts at New York for the week ending June 3 were 3,271,326 bushels—a trifle less than the preceding week. Of the receipts for the last week, 29 per cent. was by rail. For the same week Baltimore received 779,480 bushels; Philadelphia, 1,463,600; Boston, 502,900. Philadelphia's receipts for a few weeks have been large without precedent.

Receipts and shipments at Chicago and Milwaukee for the same week have been:

| | Receipts. | Shipments. |
|---|---|---|
| Chicago | 4,708,354 | 3,809,354 |
| Milwaukee | 485,580 | 261,900 |

Very seldom have the Chicago receipts been so large, and but three times before since last fall have the aggregate receipts of the eight northwestern markets been as great as the Chicago receipts alone this last week. About three-fourths of the Chicago receipts are corn; nearly three-fourths of the Milwaukee receipts are wheat. The bulk of the business is now so great that it might seem that the carriers would be troubled to handle it; but this does not appear to be the case, as the lake vessels and canal boats, whose rates are quickly affected by the demand for transportation, have barely been able to maintain their rates.

## Railroad Earnings.

Earnings for various periods are reported as follows:

| | 1877-78. | 1876-77. | Inc. or Dec. | P. c. |
|---|---|---|---|---|
| *Year ending March 31:* | | | | |
| Chi., Rock Island & Pacific | $7,895,870 | $7,854,567 | I. $41,303 | 0.5 |
| Expenses | 4,384,514 | 4,505,202 | D. 120,688 | 2.7 |
| Net earnings | $3,511,356 | $3,349,365 | I. $161,991 | 4.8 |
| P. c. of expenses | 55.50 | 57.39 | D. 1.89 | 3.3 |
| Nashua & Lowell | 505,057 | 507,045 | D. 1,988 | 0.4 |
| Expenses | 339,911 | 361,726 | D. 21,815 | 6.0 |
| Net earnings | $165,146 | $145,319 | I. $19,827 | 13.6 |
| Earnings per mile | 9,440 | 9,479 | D. 37 | 0.4 |
| P. c. of expenses | 67.31 | 71.34 | D. 4.03 | 5.6 |
| *Year ending April 30:* | | | | |
| Boston & N. Y. Air Line | $265,926 | $174,355 | I. $91,571 | 52.5 |
| Expenses | 188,443 | 126,753 | I. 61,690 | 48.7 |
| Net earnings | $77,483 | $47,602 | I. $29,881 | 62.8 |
| Earnings per mile | 5,139 | 3,487 | I. 1,652 | 47.2 |
| P. c. of expenses | 70.84 | 72.85 | D. 2.01 | 2.8 |
| *Five Months ending May 31:* | 1878. | 1877. | | |
| Chi., Mil. & St. Paul | $3,621,000 | $2,369,928 | I. $1,251,072 | 52.8 |
| *Four Months ending April 30:* | | | | |
| At. & Great Western | $1,108,863 | $1,103,574 | I. $5,289 | 0.5 |
| Chi., Burlington & Quincy | 4,246,448 | 3,596,866 | I. 649,582 | 18.1 |
| Net earnings | 1,763,965 | ..... | ..... | ..... |
| P. c. of expenses | 60.76 | ..... | ..... | ..... |
| Louisville, Cincin. & Lexington | 274,445 | 306,570 | D. 32,125 | 10.5 |
| Louisville & Nash'e. | 1,705,200 | 1,659,167 | I. 46,033 | 2.8 |
| Philadelphia & Reading | 2,798,489 | 3,627,425 | D. 828,936 | 22.9 |
| St. Paul & Sioux City | 179,775 | 129,044 | I. 50,731 | 39.3 |
| Net earnings | 66,693 | 25,748 | I. 40,947 | 159.3 |
| P. c. of expenses | 62.82 | 80.07 | D. 17.25 | 21.6 |
| Sioux City & St. Paul | 116,104 | 73,175 | I. 42,929 | 58.6 |
| Net earnings | 33,349 | 9,834 | I. 23,515 | 239.1 |
| P. c. of expenses | 71.34 | 86.77 | D. 15.43 | 17.8 |
| Worthington & Sioux Falls | 26,739 | 5,592 | I. 21,147 | 377.6 |
| Net earnings | 15,780 | ..... | ..... | ..... |
| P. c. of expenses | 41.04 | 113.83 | D. 72.79 | 63.9 |
| *Three months ending March 31:* | | | | |
| Del. & Hudson Canal Co., leased lines | $813,083 | $796,769 | I. $16,314 | 2.0 |
| Net earnings | 289,691 | 196,251 | I. 93,440 | 47.6 |
| P. c. of expenses | 64.38 | 75.35 | D. 10.97 | 14.6 |
| *Two Months ending Feb. '28:* | | | | |
| Erie | $2,425,430 | $2,092,013 | I. 333,417 | 15.9 |
| Net earnings | 660,790 | 192,497 | I. 468,293 | 243.3 |
| P. c. of expenses | 72.77 | 90.80 | D. 18.13 | 20.0 |
| *Month of April:* | | | | |
| At. & Great Western | $276,372 | $303,142 | D. $26,770 | 8.8 |
| Louisville, Cincin. & Lexington | 64,761 | 72,997 | D. 8,236 | 11.3 |
| Louisville & Nash'e. | 360,000 | 361,372 | D. 1,372 | 0.4 |
| Philadelphia & Reading | 903,765 | 1,160,898 | D. 257,133 | 22.1 |
| St. Paul & Sioux City | 49,451 | 38,166 | I. 11,285 | 29.5 |
| Sioux City & St. Paul | 28,864 | 21,403 | I. 7,461 | 34.9 |
| Worthington & Sioux Falls | 7,326 | 2,506 | I. 4,820 | 192.8 |
| *Month of May:* | | | | |
| Chi., Mil. & St. Paul | $799,000 | $607,140 | I. $191,860 | 31.6 |
| Scioto Valley | 24,289 | ..... | ..... | ..... |
| *Third Week in May:* | | | | |
| Denver & R. Grande | $20,417 | $14,294 | I. $6,123 | 42.8 |
| St. Louis, Iron Mt. & Southern | 65,800 | 84,631 | D. 18,831 | 22.3 |
| *Week ending May 24:* | | | | |
| Great Western | $83,136 | $77,019 | I. $3,117 | 7.9 |
| *Week ending May 25:* | | | | |
| Grand Trunk | $151,959 | $157,274 | D. $5,315 | 3.4 |

## Water Rates.

Lake rates are substantially unchanged, in spite of the increased shipments. The rates quoted for a week past have been 1⅛ to 2 cents per bushel for corn from Chicago to Buffalo, and 2⅛ to 2¼ for wheat, the lower rates prevailing. The rate from Milwaukee is the same.

Canal rates have been a little lower, closing at 5¼ cents per bushel for wheat, 4⅜ for corn and 3¼ for oats from Buffalo to New York. Through quotations from Chicago to New York by lake and canal have been 8 cents for wheat and 7¼ for corn, against 12 cents for wheat and 11.2 for corn through by rail. The through rail rate to Baltimore, however, is but 10.2 cents for wheat and 9.5 for corn. The railroads which receive grain from propellers at Buffalo and Erie receive their proportion of the through rail rate, which, from Bufialo to New York now amounts to about 5⅛ cents per bushel for wheat, and 5⅛ for corn, or very nearly the canal rate.

Ocean rates have been pretty steady for some weeks at about 7⅛ to 8d. per bushel for grain, by steam, from New York to Liverpool, and 5s. 9d. to 6s. per quarter (80 lbs.) by sail, to Cork for orders. Last Tuesday, under a pressure of shipments offered, some contracts were made at 8⅛. A contract is reported from New Orleans, by steam, at 9¼d. per bushel for corn, and $\frac{5}{16}$ to $\frac{3}{8}$d. per pound for cotton. The cotton rate from New Orleans has often, if not generally, been ⅜ to $\frac{15}{32}$d.

The Buffalo *Commercial Advertiser* says:

"The effect of a long navigation season and strong competition from the railways is seen in unusually low freight averages. The following comparative exhibit, showing the average rates from Chicago to Buffalo by lake, for the month of May, on wheat and corn, and also the average from Buffalo to New York by canal, on the same cereals, for the seasons named, tell their own story of 'hard times' for carriers:

| | Lake. Wheat. Cts. | Lake. Corn. Cts. | Canal. Wheat. Cts. | Canal. Corn. Cts. |
|---|---|---|---|---|
| 1878 | 2.5 | 2.2 | 5.8 | 5.2 |
| 1877 | 3.5 | 2.9 | 5.8 | 5.0 |
| 1876 | 3.0 | 2.7 | 6.7 | 5.8 |
| 1875 | 3.9 | 3.7 | 7.4 | 6.6 |
| 1874 | 4.5 | 4.0 | 11.7 | 10.8 |
| 1873 | 7.4 | 6.5 | 11.8 | 10.6 |
| 1872 | 8.0 | 7.4 | 12.8 | 11.8 |
| 1871 | 4.5 | 4.1 | 11.5 | 10.5 |
| 1870 | 5.0 | 4.4 | 11.5 | 10.7 |

"It will be observed that the average for last month is just half that for May, 1870, when vessel-owners supposed they had got as low as they could and live. Nevertheless only the very largest and most economical vessels can be operated at these figures, and there is no money in them even then."

## Freights from Missouri River Points.

A new tariff on freights from Atchison, Leavenworth, Kansas City and St. Joseph took effect June 3. The rates are as follows per 100 lbs., in cents:

| | Boxed Meats. | Wheat. | Corn. | Flour, per bbl. |
|---|---|---|---|---|
| To St. Louis | 20 | 20 | 15 | 40 |
| To Chicago | 25 | 25 | 20 | 50 |
| To Milwaukee | 27½ | 27½ | 22½ | ... |
| To Toledo | 29 | 30 | 25 | 60 |

Rates to other Mississippi River points the same as to St. Louis. To East St. Louis 2 cents per 100 lbs. must be added for the transfer across the river.

From the same points the following are now the rates on shipments bound to Philadelphia, Baltimore and New York, in cents, per 100 lbs.

| Leavenworth, etc., to | 1st class. | 2d class. | 3d class. | 4th class. |
|---|---|---|---|---|
| St. Louis, Hannibal or West Quincy | 55 | 45 | 30 | 20 |
| Chicago | 75 | 60 | 40 | 24 |
| Toledo | 101 | 80 | 55 | 29 |

These charges are made to equalize rates as far as possible.

## Cotton Movement.

For the nine months of the crop year from Sept. 1 to May 31 receipts of cotton, in bales, are reported as follows by the *Commercial and Financial Chronicle:*

| 1877-78. | 1876-77. | 1875-76. | 1874-75. | 1873-74. |
|---|---|---|---|---|
| 4,196,104 | 3,903,725 | 4,018,014 | 3,408,425 | 3,714,006 |

This year's receipts 7.4 per cent. greater than last year's, and larger than ever before. Last year 96⅜ per cent. of the whole crop was received in these nine months. The exports this year for the same period have been 3,190,000 bales, against 2,836,779 bales last year, an increase of 12½ per cent. New Orleans this year received 32.4 per cent. of the total, against 30 per cent. last year. Charleston, the Florida ports, Galveston and Norfolk show smaller receipts this year than last; all the other ports larger receipts. The percentage received at each port during the nine months has been:

| | 1878. | 1877. | | 1878. | 1877. |
|---|---|---|---|---|---|
| New Orleans | 32.4 | 30.0 | New York | 3.4 | 3.1 |
| Mobile | 9.7 | 9.1 | Florida | 0.3 | 0.5 |
| Charleston | 10.9 | 11.9 | North Carolina | 3.4 | 3.3 |
| Savannah | 13.9 | 11.9 | Norfolk | 11.8 | 13.9 |
| Galveston | 10.5 | 12.8 | Other ports | 3.7 | 3.5 |

The receipts include what is first marketed at the port in question, and no part of what may be sent to it from another port where it has already been counted.

## Coal Movement.

Coal tonnages for the week ending May 25 are reported as follows:

| | 1878. | 1877. | Inc. or Dec. | P. c. |
|---|---|---|---|---|
| Anthracite | 220,359 | 493,636 | D. 273,277 | 55.4 |
| Semi-bituminous | 65,125 | 64,899 | I. 226 | 0.3 |
| Bituminous, Pennsylv'a. | 35,279 | 32,663 | I. 2,616 | 8.0 |

The bituminous and semi-bituminous trade is reported as gaining slowly, owing to the higher prices of anthracite.

## Norfolk Cotton Business.

Cotton receipts at Norfolk, Va., for May were 11,803 bales, an increase of 3,072 bales, or 35.3 per cent. over 1877. For the nine months of the cotton year from Sept. 1 to May 31 the receipts were, in bales:

| | 1877-78. | 1876-77. | Inc. or Dec. | P. c. |
|---|---|---|---|---|
| At., Miss. & Ohio R.R. | 212,938 | 212,513 | I. 425 | 0.2 |
| Seaboard & Roanoke R. R. | 166,761 | 246,939 | D. 80,178 | 32.5 |
| Canals and otherwise | 40,792 | 40,680 | I. 112 | 0.3 |
| Total | 420,491 | 500,132 | D. 79,641 | 15.9 |

Of the receipts this year 186,972 bales were local, consigned to Norfolk, and 233,519 bales bound through to points beyond.

## Erie Canal.

The business of the Erie Canal at Buffalo from the opening to May 31 was as follows:

| | 1878. | 1877. | Increase. | P. c. |
|---|---|---|---|---|
| Boats cleared | 1,904 | 627 | 1,276 | 203.2 |
| Tolls received | $137,515.64 | $41,144.09 | $96,371.55 | 234.2 |

The canal opened April 15 in 1878, and May 8 in 1877. The average number of boats cleared per day was 40.5 this year and 26.2 last year. Each boat carries about 25 carloads of grain.

## Texan Cattle Traffic.

It is estimated by some who have investigated the subject that there will be 300,000 head of cattle driven north from Texas this season, and that the shipments by rail will be 150,000 head more. This is an increase of about 25 per cent. over last year.

## RAILROAD LAW.

### Connecticut Law on Bridges.

Among the laws passed by the Connecticut Legislature at its recent session was the following:

"Section 1. Wheenevr the Railroad Commissioners shall deem it necessary for the safety of persons traveling upon any railroad in this State, that guard-rails or any other appliances to secure safety should be placed upon any bridge belonging to such railroad, said Commissioners may order the corporation owning or operating such railroad to place such additional guards upon said bridge as they may deem necessary and proper to accomplish the object aforesaid.

"Sec. 2. Any railroad company which shall neglect or refuse to comply with the orders of the Railroad Commissioners given in pursuance of section one of this act, shall forfeit and pay to the Treasurer of this State twenty-five dollars per day for each day of such neglect or refusal."

Another law requires companies to put up at all bridges over the track, which are less than 18 ft. in the clear above the track, suitable guards to warn trainmen of the approach to the bridge. The penalty for failure to comply is $50 for each month's delay.

### Fences—Liability of Lessor Company.

In Ditchett against the Spuyten Duyvil & Port Morris Co., the Supreme Court held that a railroad company does not absolve itself from liability in respect of the fences on the side of its road by leasing the road to another company and parting with possession accordingly; and hence they held that one who, walking along the highway, fell into an open cut where the fence was gone, could recover from the lessor.

The Court of Appeals, reversing this decision (67 N. Y., 425), holds that where a railroad company has established the necessary fences, and parts with the possession and control of the road under a lease containing a covenant by the lessee to keep the premises in order, the lessor is not liable. The Court puts the decision upon the general principle applicable to cases of other leases, but also holds that the provision of the act of 1854 as to fencing does not apply for the protection of persons traveling on the highway.—*New York Register.*

### Responsibility for Acts of Employes.

In Newsom against the Georgia Railroad & Banking Company, the Georgia Supreme Court lately held, on appeal:

Under sections 3,033 and 3,368 of the code, a railroad company is responsible for damage done to any person by the carelessness or negligence or improper conduct of its agents in or by the running of the cars or engines of the company, and the presumption fixed by the first of the sections cited against the company is not rebutted by proof that the engineer, whose negligence, carelessness and improper conduct in the use of the engine and whistle attached thereto, caused the injury, was prompted by personal malice and revenge toward the plaintiff, but the plaintiff may recover from the company the same amount of damage for the injury as if it had been a case of carelessness and improper conduct unmixed with personal grievance of the engineer.

### Coupons and Interest Warrants.

In Evertsen against the National Bank of Newport, plaintiff sued upon 10 coupons, so called, for semi-annual interest, issued by a railway company, and for 47 *interest warrants* of other bonds issued by another corporation, the defendants being holders of the fund applicable to payment of both. The *coupons* were, in terms, a promise of the railroad company to pay the bearer at, etc., a specified sum on a specified day, for semi-annual interest on bond No. —. The *interest warrants* were in a different form, thus: "Interest warrant for $35, upon bond No. —, of the Danville, etc., R. R. Co., payable in coin, at the office of, etc., on, etc." The Supreme Court applied to both classes of paper the rule that coupons, although detached from the bonds, are negotiable, and the title of a *bona fide* purchaser for value is protected.

The Court of Appeals, in 66 N. Y., 14, affirmed this decision as to the *coupons* on the ground that they were within the statute of negotiable paper, but they reversed it as to the *interest warrants*, on the ground that these were not in form negotiable, and there was no proof of usage or custom such as would give a negotiable character to them.—*New York Register.*

### Taxation of Land Grants.

In the Sioux City & St. Paul Company against Osceola County, Ia., the United States Supreme Court gave its decision as follows:

This is an action to restrain the collection of taxes for 1873 on lands granted to the railroad company, and to declare the same illegal and void. The court below discussed the plaintiff's petition, and confirmed the tax. The plaintiff appealed, and the Supreme Court holds the question is: Did the plaintiff, at the time the taxes were levied, hold such an interest or title in the lands that they were subject to taxation? Under the act of Congress of May 12, 1864, granting to the State lands for the use of railroads, the State is only a trustee, and acquired no title to the land until the terms of the grant are complied with by the railroad companies in the building of the road, and on the issuance of a patent. The railroad company acquired no title to the land until it had earned it by building of the road, and on receiving a patent from the State. Although, under an act of the eleventh General Assembly, the company had earned the land, and were entitled to the land, it was not until the fifteenth General Assembly (1874-5) that the Governor was directed to issue a patent to the company. Hence the title did not vest in the company until then, and therefore the taxes for 1878 assessed against the company were invalid. The Court, however, said it would be competent for the county to show fradulent design on the part of the company in delaying to procure the patent and title, to evade taxation.

### Obligations to Maintain Fence.

In the case of the Miami County Infirmary against the Dayton & Michigan Company, on appeal, the Ohio Supreme Court holds:

1. Where a fence constructed by an individual land owner serves as a partition fence between a railroad track and the inclosed fields of such individual owner, but not so divided that each owner is charged with maintaining in repair a distinct portion thereof, the railroad company and individual land owner are, each, under equal obligations to keep and maintain the entire fence in repair until so divided.

2. If the land owner, knowing the particular fence to be out of repair, turns his stock into a field inclosed by such defective fence, and, by reason of its insufficiency, his stock goes upon the railroad track and is killed by a passing train run without negligence, such land owner is chargeable with contributory negligence, and cannot recover for the loss.

## THE SCRAP HEAP.

### Railroad Manufactures.

The Lawrence Iron Works, at Ironton, O., made an assignment to Evan F. Williams, May 21.

The Cambria Iron Co., at Johnstown, Pa., has an order for 5,000 tons of iron rails for the Burlington & Missouri River Railroad in Nebraska.

The Burgess Iron & Steel Co., at Portsmouth, O., recently put in its third steam hammer. The new hammer is to be used for hammering steel bars.

A correspondent of the Pittsburgh *Telegraph* says of the failure of Kimberly, Carnes & Co., the great iron masters of the Shenango Valley: "Undoubtedly some of the concerns will show themselves entirely solvent, as, for instance, the Wampum Furnace Co., and the Snyder Coal Co., but the concerns of Samuel Kimberly, Kimberly Carnes & Co., the Etna Iron Works (limited), the Neshannock Iron Co., and Bradley, Reis & Co., will scarcely make a good showing. The property will undoubtedly estimate far in excess of the debts, but it is of such a character that, in the present depressed state of the iron trade, the keeping of the different businesses in operation would but serve to run the operators still more hopelessly into debt."

The only large sales of steel rails reported are 10,000 tons to the Southern Pacific, on private terms. The mills are all full of orders, and sales made now cannot be delivered before fall.

The American Cast Steel Co. has its works in Cleveland, O., in running order, and is making about 1,500 lbs. a day. The steel is made from Norway iron, is reheated and forged under a steam hammer.

Maidencreek Furnace at Lenhartsville, Berks County, Pa., went into blast last week.

At a shareholders' meeting of the Canadian Engine & Machinery Co., of Kingston, held in Montreal on Tuesday last, it was resolved to sell the assets at 40 cents on the dollar. The parties to the new organization which makes this offer, include Messrs. George Stephen, R. Reekie and John Rankin, of Montreal, to which city it is proposed to remove the works.—*Toronto (Ont.) Monetary Times.*

In the shops at Cleveland formerly owned by the McNairy & Claflen Co., a passenger car is being built to run on the one-rail road at Bradford, Pa. It is 28 ft. long by 8 ft. 2 in. wide, with seats running lengthwise. It is carried on two 34 in. double-flange wheels in the centre, with wheels or rollers below to steady it.

The Hall Manufacturing Co., of Grand Rapids, Mich., makes a concave or ∩ rail the hollow centre being filled with Norway pine. The Indianapolis Rolling Mill Co. is now making rolls to roll a specimen lot of these rails and will, if they prove successful, make their manufacture a regular part of its business.

The Canada Steel Co., at Londonderry, N. S. is full of work, and the capacity of the works is to be increased.

### Bridge Notes.

Sealed proposals will be received until noon of June 21, at the office of L. T. Strader, County Auditor of Franklin County, in Columbus, O., for the excavation, masonry and superstructure of five highway bridges, the spans being 130, 105, 100, 80 and 70 feet. Bids will be received for wooden, combination or iron bridges.

The Keystone Bridge Co., of Pittsburgh, has the contract for three iron bridges on the extension of the Holyoke & Westfield road in Holyoke, Mass.

### Notes.

In Pennsylvania they have not decided what the gauge of a one-rail railroad is, but they have agreed that it has a gauge and is a railroad. What the gauge really is, was a problem too deep for the legal mind, but they decided that it came in under the head of "three feet or less," and let it go at that.

An old bachelor friend advocates the two-feet gauge since he has found that the cars on the Billerica & Bedford road have only single seats. He says its general adoption will prevent the disgusting displays of affection now so often seen in the cars; a young man can't very well hug his girl when she has to sit in the seat ahead of him.

A New England capitalist whose neighbors used to twit him on his defaulted bonds and non-dividend paying railroad stocks, has heard fewer remarks on his investments since he offered to exchange his securities for deposits in broken savings banks, policies in bankrupt insurance companies or unimproved real estate bought in under foreclosure. Railroad investments are not the only unproductive ones nowadays.

An ardent temperance man wants all the railroad companies in the United States to agree in refusing to carry any description of intoxicating liquor as freight. We have not heard that any company has signed the pledge as yet, but we fear it would do no good if they did. Some enterprising brewers or distillers would at once organize a system of pipe lines.

### The Seaboard Pipe Line.

At a recent meeting of the Engineers' Club of Philadelphia, Gen. Herman Haupt made very interesting remarks in regard to the Seaboard Pipe Line. About two years ago the Pennsylvania Transportation Company called upon Gen. Haupt for estimates in regard to cost of transporting oil to the seaboard by means of pipes. The first pipes in the oil regions for the transportation of oil were laid 14 or 15 years ago. At present there are some 2,000 miles of pipe in operation between the wells and the railroads.

At first the pipe line companies met with a very determined opposition from the teamsters and boatmen, but after waging a bitter war against the new system they had to succumb, and pipe lines became the only mode for conveying oil from place to place. The Legislature passed an act allowing pipe lines in four or five of the Western counties. The Conduit Line was started to operate between the oil regions and Pittsburgh. After a sharp contest with the Pennsylvania Railroad it succeeded in getting across the line of the railroad by using a public road. The oil was received in tanks which were mounted on wheels, hauled across the railroad, poured into receivers, and went on its way to Pittsburgh. Even with this extra expense of handling, the line paid well.

Upon visiting the oil region it was found impossible to get satisfactory data for formulating the hydraulic pressure and making necessary calculations for an estimate of cost for a long line. The Seaboard Line proposes to use a 6-inch pipe, which will give a capacity of 6,000 barrels discharge per day; the line will be tested to 1,800 lbs. pressure per square inch, and worked at 400 lbs. per square inch. Preliminary surveys have already been made. The first station will be located at Parker City, from which the oil will be forced a distance of 35 miles; the second pump will force it 26 miles further, the third pump 70 miles further, and the last pump, which will be located on the west side of Tuscarora Mountain, will send it to Baltimore, a distance of 102 miles. The pressure at each station will be 400 lbs., equal to a head of 1,200 feet of oil. Distances between stations will vary with the profile of the ground crossed.

The estimated cost of transportation is one cent per barrel at each pump, the distance between pumps being immaterial. Five cents per barrel is a full estimate of cost for transportation from the oil regions to the seaboard. A 6-inch line of pipe can be made at a cost of $8,000 per mile, making the total cost of the projected line $1,750,000. Construction of the Seaboard Line will be commenced in two or three weeks.

One of the most important points in the construction of pipe lines is to allow for contraction and expansion due to changes of temperature.

A pipe line is certainly the most economical and natural method for transporting fluids, and there is no more reason why oil transported in pipes should be exported than when transported in cars.

### Shrinking Tires with Hot Water.

The Pittsburgh *Manufacturer* says: "Hot water instead of fire is used on some of the Russian railways for shrinking tires. An iron tank one-quarter filled with water, is fixed near a stationary boiler, a steam pipe from which is led through it, capable of heating the water to 212 degrees Fahr.; into this the tire is plunged by means of a portable crane, and after an immersion from ten to fifteen minutes, is taken out and immediately placed on the wheel. Three men only are employed, who will fix from 12 to 14 tires in a day of eleven hours. The allowance for shrinking—the difference between the diameter of the skeleton and that of the tire—is 0.75 millimeter to a meter. This is ascertained by gauges of great accuracy, and, if deviated from, the tire will be either loose after cooling or too small to get on the wheel. When fire is used, the tire can never be heated equally or cooled equally in all parts, and in consequence is sure to be more or less oval in form, which is not the case in hot water. The liability to breakage in the former, produced by the irregularity in form, is, of course, more dangerous and costly than the loosening of the tire."

### How a Frenchman Describes a Collision.

Coming from Brussels by way of the Luxembourg Railroad, we had just passed the viaduct of Mezieres when the train halted abruptly. There was no station and we knew no cause for the stop, but after a time the doors of the carriages were opened and the guard said we must wait here two hours until the line was clear.

Going forward we found two locomotives thrown together, both ruined by the deadly embrace. Behind and around these was a confused mass of embers and bent iron, while here and there a little blaze still flickered and died out. By the road lay several dead bodies, while in another place were some men, some women and two children, waiting the return of the litters which had already gone with others to the village near by; these were wounded.

It appears that there had been a collision.

Two of these moving monsters, these semi-intelligences called locomotives, had met unexpectedly. Neither had given way; the locomotive has one attribute of man—obstinacy, but it lacks another—caution. Hence this wreck.

What is a collision? Is it an accident? No. Is it then a crime? No.

A collision is a syllogism. Given as premises the attempt of man to create semi-intelligences, there results necessarily a conflict of these monsters. In this conflict man himself is torn to pieces; the creator becomes the destroyed.

Fatal result of ambition.

What is the ambition which leads man to build the railroad? to create these semi-existent monsters, which, in their turn, rend him to pieces?

It would appear that in all ages man has desired to travel with speed, to move from place to place more quickly than nature alone permits him. To this end he has subdued the horse, the ass, the dromedary, and finally fire and water; to this end he devised the bridle-path, the highway, the turnpike, the iron road, and yet labors to cleave the air with the balloon.

And to what end? That he may say "Yesterday evening I was at Marseilles, at Lyons, at Toulouse, at London, at Aix-la-Chapelle; this morning I am in Paris."

This is the end; these torn and broken masses of iron and brass, this burned wood-work, these mangled corpses, these wounded innocents, this horror in the midst of the peace of nature.

Man progresses, but he does not learn. The horse threw him, the ass kicked him, the dromedary bit him and now the railroad train smashes him up. Yet he will go on to devise yet quicker means of traveling. He will yet travel with the speed of lightning, but he will be destroyed as by an explosion of nitro-glycerine. He will sail through the air with the speed of the wind, but he will fall to the ground like a flash of lightning.

Nevertheless he will not be satisfied to walk.

Why?

Partly because of this mysterious inborn tendency to speed; partly because every civilized or semi-civilized man recognizes in his heart that Paris is the centre of the world, and he desires to see Paris before he dies. This he knows, and he knows that if he must depend upon his legs alone, this desire must remain ungratified.

Therefore man devises the railroad, the steamship, the telegraph; therefore he risks the collision, the explosion, the wreck.

From the collision there comes this central truth: France is the leader of the world, Paris is the leader of France. Paris is not alone a city, it is the centre of Man. Man recognizes this truth.

This collision, this syllogism then, is not without its uses. It kills some, but it teaches others; it destroys, but it also demonstrates.

Fatal lesson! Instructive calamity!

### A Narrow Escape.

The Ypsilanti correspondent of the Detroit *Telegraph* tells the following story: "A wonderful escape from serious accident, if not from death, recently occurred on the Michigan Central Railroad, between this city and Geddes, owing to the presence of mind of the night telegraph operator at this station. The conductor and engineer of a train going west received orders from the dispatcher at Jackson to wait at Ypsilanti for train No. — and train No. —, both bound east. Instead of doing so, however, the engineer, as soon as the first train passed, pulled open the throttle and continued on his way, unheeded by the conductor. The night watchman observed the movement, but was powerless to prevent it. However, his cries and gesticulations attracted the attention of the operator, who, instead of watching the receding train, not knowing what to do, ran to the instrument and though it is contrary to the rules of the company to transact any business on the dispatcher's wire except with the main office at Jackson, broke in and called Geddes. The operator at that place, fortunately, happened to be on hand, and, answering the call, received the awful intelligence that the two trains would come into collision if he could not stop the one now almost due at his station. Even as this conversation was going on, the train came thundering around the curve and was just about to go by as the operator ran to the door and signalled it to stop, which of course, it did. The train men upon being informed of what would have occurred had they not been halted, turned deadly pale, and inwardly gave thanks for their narrow escape. In a few moments the erring engineer's whistle was heard, and the ponderous train came dashing up, its occupants still unconscious of any wrong. He was told the status of things, which started the sweat on him as he thought of the narrow escape. The dispatcher, who had been listening to what was going on, immediately complimented his subordinates, and the usual workings of the road were resumed."

### New Freight Brake.

The Davenport (Ia.) *Democrat* says: "All freight cars hereafter constructed by the Chicago, Rock Island & Pacific will have a newly-patented brake. In place of the old wheel at the end of the car, which the brakeman must risk life and limb to turn, the new one has simply a lever formed of an iron rod about 2½ feet long, one end of which is attached to the top and three feet from the end of the car. To this rod, three inches from the end attached to the car, is fastened a chain, working on pulleys, which in its turn is attached to the brake. All the brakeman now has to do, when 'on brakes' is whistled, is to seize this rod and raise it to a perpendicular position, where it is held by a ratchet wheel, and the brakes are so tight that the wheels will slide along the track. To let them off he places his foot on the catch and the rod, of its own weight, falls back on the car."

### A Palace Horse Car.

Dom Pedro, Emperor of Brazil, is having a street car built for his own use by John Stephenson & Co. It is somewhat larger than the ordinary car in use here and is finished in ash, basswood, plain and curled cherry and plain and bird's-eye maple. The roof is of the perforated wood now in common use, allowing impure air to escape when the ventilators are closed. The exterior is painted in the national Brazilian colors—green and gold, the upright pillars of lake, with gold-line ornamentation, and the lower wood-work a delicate cream-green. The word "special," in large letters, is upon the outside. The Brazilian arms occupy the middle panels on either side and sketches of Brazilian and North American scenery fill the remaining panels. In each side are five plate-glass windows, the centre one 4 ft. 6 in. wide by 2 ft. 8 in. high, the others 21 in. in width by the same height. All the metal work is nickel-plated. A large central lamp lights the car at night. A sofa, two chairs and a centre table, in the East-lake style, comprise the furniture. The interior panels are also decorated with landscapes. Lambrequins of dark blue stamped leather, with black velvet borders, studded with brass nails and with a fringe of wooden tassels, are over the windows. In the doors are set large mirrors, and smaller ones fill the space between the windows. The floor will be carpeted with Axminster. The platforms are protected by wire gates, and a life-guard prevents persons from getting under the wheels. The car will be used to convey the Emporer from his country house to his executive palace, in Rio de Janeiro. It will occupy the court of his palace when not in use, and when required will be switched upon the track of the Botanical Garden Railroad Company, "free of charge."—*New York Tribune.*

### Report on Locomotive Tests—Corrections.

We are requested to make the following corrections in the report of experiments made by Master Mechanic Johann on the Wabash Railway, West Division, published in the *Railroad Gazette* for May 24:

Page 254.—In the description of apparatus used, it should read: "Two Richards' indicators were used—*one* on each cylinder," the word "one" having been omitted.

Page 255.—Weight of train, excluding engine and tender, on trip B, should read 790,000 lbs., instead of 700,000 lbs. Also, the power consumed in the friction of the machine on trip A should read 15 per cent. instead of 10 per cent.

### The Telephone on a Railroad.

The Toronto (Ont.) *Monetary Times* says: "A practical and somewhat important use of the telephone is being made at Amherstburg Station of the Canada Southern Railway. The railroad company have a telephone wire under the Detroit River, from the upper slip on the Canada side to the Stony Island slip, for greater convenience in communicating orders for the movement of the ferry barges which are now used, towed by tugs, to transport laden cars, pending the repairs of their large steamer Transfer.

### He Couldn't Stop.

Al. Barker was prowling around the locomotive machine shop, the other day, and noticing Tom Bexon and Anton Rossler taking turns at the crank in boring out a cylinder, was very anxious to relieve them for a few moments, "just to see how it went;" but Tom, with becoming gravity, told him that the crank must be steadily turned without an instant's cessation or the work would be spoiled. Al. still begged to be allowed to try it, and finally seated him at the task, while he and Anton perched themselves upon a friendly bench and quietly chuckled as they watched the perspiration starting from the manly brow of their victim. Barker soon tired of the work and wanted to be relieved, but was told by Tom that he must finish the job, and not let the machine stop or the cylinder would be ruined, and having exhausted his persuasive powers upon Bexon he appealed to Anton, who simply responded, "It's better wot you keep 'em turning, Meester Barker—you once let's 'em stop somedimes und you spboil 'em, sure!" Al. fumed and fretted and foamed and begged, and turned away for dear life, and ground out all the fancy cuss words in his vocabulary, until it suddenly occurred to him that he was being victimized, when his fingers relaxed from the crank and he stalked out of the shop with the air of a man who considered that he had been basely deceived.—*Aurora (Ill.) Beacon.*

## OLD AND NEW ROADS.

**Alabama & Chattanooga.**—This road is now operated under the name of the new company, the Alabama Great Southern, but remains under control of the Agent and Trustee for the purchasers.

**Atchison, Republican Valley & Pacific.**—This company has been organized to build a branch of the Central Branch, Union Pacific, from Concordia, Kan., northward up the Republican Valley to White Rock, about 30 miles, with a possible future extension to a point on the Union Pacific near Willow Island, Neb.

**Atchison, Topeka & Santa Fe.**—The contract for the ties for the New Mexico Extension from La Junta to Trinidad has been let to Walsen & Levy, of Colorado.

The company offers to extend its Florence, Eldorado & Walnut Valley road from Eldorado, Kan., southwest 15 miles to Augusta, provided a reasonable amount of aid is voted along the line.

**Baltimore & Delta.**—Negotiations are pending for the consolidation with this company of the Baltimore, Hampden & Swann Lake Company. The latter owns the right of way into Baltimore and about seven miles of graded roadbed. It is probable that the consolidation will soon be completed.

**Billerica & Bedford.**—The assignees in bankruptcy are trying to sell this road at private sale and are willing to take $20,000 for it, which is about $2,350 per mile, and

about one-third of the cost of the road. It runs from Bedford, Mass., to Billerica, 8½ miles, and is of 2 ft. gauge.

**Brattleboro & White Hall.**—The sum of $200,000 having been subscribed to the stock of this company, the directors have resolved to begin work at once. A preliminary survey is now being made from Brattleboro, Vt., through the West River valley to Jamaica.

**Burlington & Missouri River in Nebraska.**—It is stated that over $2,750,000 of this company's old bonds have been offered for exchange for the new 6 per cent. consolidated bonds. All the old 8 per cent. bonds not offered by June 3 are subject to be drawn for payment at par.

**Canadian Pacific.**—Sealed proposals will be received at Ottawa, Canada, by F. Braun, Secretary of the Department of Public Works, until noon of June 29, for the construction of part of the Georgian Bay Branch. The line will extend from Station O of location of 1877 on the western side of South River, near Nipissingan post-office, to the head of navigation of French River, about 5 miles east of Cantin's Bay, and will be in length about 50 miles.

Proposals will be received in two forms (A and B) as set forth in a memorandum of conditions of contract, which with specifications and other information may be had or seen or application at the Department of Public Works. No tender will be entertained unless on the printed form and unless the printed conditions are complied with.

**Cheraw & Chester.**—This road is now completed to Rich Hill, S. C., 12 miles eastward from Chester. It has been opened for business and a train is running regularly.

**Chicago, Burlington & Quincy.**—This company is now running a through car from Chicago to Lincoln, Neb., the car being transferred across the Missouri at Plattsmouth, and running thence over the Burlington & Missouri River Railroad

**Chicago, Rock Island & Pacific.**—At the annual meeting in Chicago, June 5, resolutions were passed, instructing the board to make some arrangement for an apportionment of capital stock to represent the surplus invested heretofore by the company in the securities of the leased lines now controlled by it, in order that the stockholders may receive dividends on the capital so invested.

**Cincinnati, Hamilton & Dayton.**—Cincinnati dispatches say that, on petition of some stockholders of this company, an injunction has been granted prohibiting this company from paying any more interest on the bonds of the Cincinnati, Hamilton & Indianapolis Company. It is also reported that proceedings have been begun to foreclose the mortgage on the Cincinnati, Hamilton & Indianapolis road.

**Concord.**—At the annual meeting last week quite a breeze was stirred up by a resolution offered for the appointment of a committee to investigate the management of the company. The mover of the resolution spoke sharply of contracts made affecting the business of the road unfavorably and also charged that money had been spent to affect legislation. After a pretty sharp discussion, the resolution was laid on the table and the directors' report was approved.

**Dallas & Wichita.**—This road has been placed in the hands of a receiver, on application of the Kansas Rolling Mill Co., which furnished the rails for the road and holds all the bonds. The road is completed from Dallas, Tex., northwest 17 miles, and is graded some 20 miles further. Its progress has been hindered by quarrels among the stockholders.

**Dannemora.**—The bids for building the railroad from the Dannemora prison, in Clinton County, N. Y., eastward to Plattsburg, 18 miles, have been opened. The lowest bid is that of O'Brien & Kelly, $73,000. The work is to be finished by Nov. 15.

**Delphos, Bluffton & Frankfort.**—The contract for building and equipping 26 miles of this narrow-gauge road in Indiana has been left to Gen. N. McKee for $6,000 per mile, half in cash and half in bonds.

**Detroit & Milwaukee.**—The final hearing in the foreclosure suit began May 31 in the Wayne Circuit Court, at Detroit. On behalf of the plaintiffs who ask the decree, it was stated that holders of 92 per cent. of the bonds had assented to the plan of reorganization, and joined in desiring the sale of the road. The opposition to the decree was from holders of first-mortgage bonds, who believe that they ought to have more than the plan allows them, and from holders of what are called the Street-Douglas bonds. A large amount of testimony was taken as to the value of the road and the property covered by the mortgages. The argnments were concluded June 3, and the Court reserved its decision.

**Dutchess & Columbia.**—Mr. John Crosby Brown, trustee, gives notice that he is now prepared to make final distribution of the money received by him from the sale of this road under the order of the New York Supreme Court, among the holders of the first-mortgage bonds, on presentation of the bonds and unpaid coupons to him as his office in New York, with proper proof of ownership.

**East Alabama & Cincinnati.**—This road is now in possession of R. J. Thornton as Receiver for the creditors. The road is in operation from Opelika, Ala., to Buffalo, 22 miles, and there is also a detached section of 5½ miles from Attala, Ala., to Gadsden, which has been worked as a branch of the Alabama & Chattanooga.

**Eastern.**—This company gives notice that in the suit to determine its power to pay the interest on the bonds of the Portsmouth, Great Falls & Conway Railroad Company no decision has yet been rendered; and if no decision should be reached by June 1, the Eastern directors will repeat their former action, and, as security for the bondholders, will set aside a fund equal to the interest accruing June 1, 1878, and to be appropriated solely to paying that interest, should the Court decide in favor of the right of the company to pay it.

**Erie.**—Receiver Jewett's report for March was as follows:

| | |
|---|---|
| Balance, March 1 | $466,149.97 |
| Receipts | 2,426,466.75 |
| Total | $2,892,616.72 |
| Disbursements | 2,667,017.96 |
| Balance, April 1 | $225,598.76 |

The disbursements included $706,562.50 for interest on bonds. The Receiver's certificates outstanding April 1 amounted to $1,239,991.70.

The Receiver formally transferred the road to the New York, Lake Erie & Western Company on June 1, as noted elsewhere.

**Evansville, Terre Haute & Chicago.**—This company is building a branch or extension of its road from Terre Haute, Ind., southeast to Knightsville, about 15 miles. The grading is all done, the iron on hand, and the road will probably be done some time in July. It is built to reach the block coal field about Knightsville.

**Harlem Extension, South.**—Under this name the bondholders now operate that portion of the Harlem Extension originally known as the Lebanon Springs road, from Bennington, Vt., to Chatham Four Corners, N. Y., 58 miles.

**Illinois Central.**—The Kankakee (Ill.) *Gazette* says: "We understand that the officers of the Illinois Central have made a proposition that if the right of way and the road-bed is provided, the company will tie, iron, equip and run a road from a point 4½ miles south of this city to Chatsworth in Livingston County. The line will be run due west for sixteen miles, then turn south to Chatsworth. This is the proposition of the Central Company, as made after an examination of the country through which the road will pass by Superintendent Jeffrey and other officers. We hear talk about an extension of the line to connect with the Paducah road, but this is independent of the direct proposition of the Central Company."

**Indianapolis, Peru & Chicago.**—The repair shops at Peru, Ind., were burned on the night of May 30, with all the tools and materials, three engines and some cars. The total loss is estimated at $100,000. The fire is said to have been caused by a stroke of lightning. Later advices put the loss at $40,000, many of the tools having received but little damage, while much material was saved also.

**Lehigh Valley.**—The Lost Creek Branch is now completed to Ashland, Pa., and was formally opened for business June 3. It has been under construction for some time, its completion having been delayed by litigation over a crossing of a branch of the Reading road. The new branch is five miles long, leaving the Mahanoy Branch at the Lost Creek breaker, near Shenandoah, running up Lost Creek to Girardville and thence to Ashland. It is considered important, as it carries the company into a district heretofore served exclusively by the Reading.

**Minnesota Midland.**—The track on this road was laid last week to Zumbrota, Minn., which is 11 miles beyond the recent terminus at Millville and 40 miles from the eastern terminus at Wabasha on the Mississippi. The route is nearly due west, through the Zumbro valley, and the road is about half way between the Winona & St. Peter and the Hastings & Dakota. It is of 3 ft. gauge.

**Nashua & Lowell.**—At the annual meeting last week resolutions were adopted authorizing the leased Wilton Railroad Company to increase its stock from $223,000 to $233,000. Another resolution was passed instructing the directors to procure the legislation necessary to authorize the purchase of the lines now leased by the company. Resolutions were also passed directing the Board to investigate the payments made to the Boston & Lowell Company since 1872, under a resolution passed by the board then in office, it being charged that over $150,000 had been paid, to which the Boston & Lowell were not justly entitled under the contract. No action was taken as to the renewal of the contract under which the road is worked jointly with the Boston & Lowell, which will expire Oct. 1.

**New York, Lake Erie & Western.**—The following is Executive Order No. 1, signed by H. J. Jewett, President, and dated May 28:

"I.—The Erie Railway and property, having been sold under a decree of foreclosure, to the New York, Lake Erie & Western Railroad Company, that company will, on the 1st day of June, 1878, take possession of the property so purchased by it, and thereafter operate the same. All accounts and transactions occurring on and after that date will be kept in the name of the said company.

"The present officers, agents and employés of the Receiver of the Erie Railway will continue to discharge the duties of their respective positions, for the new company, until otherwise ordered.

"II.—All accounts or settlements for business done in the name of H. J. Jewett, Receiver of the Erie Railway, up to June 1, 1878, will be adjusted and settled, as heretofore, with the Receiver; and reports and remittances will be made, as formerly, to and by the respective proper officers of the Receiver.

"III.—It being desirable to close the accounts of the receivership as rapidly as practicable, all companies and individuals having business with the Receiver are respectfully requested to make reports and settlements promptly."

The following circular, of same date, has been issued to agents and others, over the names of S. Little, Auditor, and B. W. Spencer, Treasurer:

"In pursuance of Executive Order No. 1 you are hereby instructed:

"1st. Commencing with the 1st day of June, 1878, all the transactions and accounts of this road will be kept in the name and under the title of the *New York, Lake Erie & Western Railroad Company.*

"2d. All former and pending accounts of the Receiver must continue in his name and be kept entirely apart and distinct from those of the New York, Lake Erie & Western Railroad Company until finally closed, that is, your remittances for all business *chargeable* to your account in the month of May, or previously, for freight billed or tickets sold, must be made to the Receiver and not to the new company: thus, all moneys collected for account of the Receiver must be put up separately and addressed to the Cashier of the Receiver, and all moneys for account of the New York, Lake Erie & Western Railroad Company must be put up by itself and addressed to the Treasurer of that company.

"3d. Whenever the name of the "*Erie Railway Company, H. J. Jewett, Receiver,*" occurs on your books or blanks, you will write or stamp New York, Lake Erie & Western Railroad Company over the same (except on the slips for remittances on Receiver's account) until a new supply can be furnished you.

"4th. You will also render, separate from your New York, Lake Erie & Western Railroad Company business, a monthly balance sheet for Receiver's account, until it is finally closed, carrying the balance over from month to month, if not all collected by the end of June.

"5th. You will open for account of the new company a new book entitled 'Agents Monthly Record of Freight and Passenger Business,' keeping the one now in use for the Receiver's business until closed. Collections for account of the Receiver can be posted into your Freight Cash Book as a separate total on the day collected.

"6th. You will use every exertion to close your account with the Receiver as speedily as possible.

"7th. You are requested to communicate with the undersigned at once on any feature of this circular which may not be fully understood by you, as it is of the utmost importance that its instructions be strictly observed."

**Nova Scotia, Nictaux & Atlantic Central.**—The Halifax (N. S.) *Chronicle* says: "The company has decided to proceed with the work on this railway. The Government positively refused to concede any departure from the terms of the contract, either as regards the character of the work required or mode of paying the subsidy. The representatives of the company here proposed to deposit $10,000 in the hands of responsible parties to secure payment of outstanding debts, and to proceed with the work on the Government's terms. If this proposition is carried out in good faith the work will proceed at an early day."

**Olean, Bradford & Warren.**—A controlling interest in the Pennsylvania section of this road has been sold to the parties who own the New York end, and who are also interested in the Buffalo, New York & Philadelphia road.

**Philadelphia & Reading.**—This company's statement is as follows for April and the five months of its fiscal year from Dec. 1 to April 30:

| | April. | | Five months. | |
|---|---|---|---|---|
| Gross Receipts: | 1878. | 1877. | 1878. | 1877. |
| Railroad | $903,765 | $1,160,898 | $3,862,198 | $4,200,761 |
| Canal | 56,590 | 104,325 | 76,394 | 138,098 |
| Steam colliers | 28,116 | 62,075 | 224,390 | 286,851 |
| Richmond barges | 2,548 | 12,821 | 26,776 | 27,250 |
| Total | $991,028 | $1,340,119 | $4,189,758 | $4,652,690 |
| Traffic: | | | | |
| Passengers | 512,139 | 532,472 | 2,454,936 | 2,522,831 |
| Tons coal | 408,620 | 661,478 | 1,690,393 | 2,168,202 |
| Tons freight | 284,545 | 230,328 | 1,284,168 | 1,192,817 |
| Tons coal on steam colliers | 34,714 | 50,928 | 206,607 | 205,767 |
| Coal mined: | | | | |
| Coal & Iron Co | 189,083 | 324,382 | 803,752 | 1,007,703 |
| Tenants | 80,150 | 116,910 | 295,479 | 404,827 |
| Total | 270,133 | 441,292 | 1,099,231 | 1,412,530 |

Work has generally been resumed in the company's mines, to fill out its June quota, and the balance of the May quota, the amount being 684,000 tons.

**Pittsburgh & Lake Erie.**—The Pittsburgh *Telegraph* says of this road: "The line, as is well known, follows the left bank of the Ohio as far as a place opposite Rochester, where the bridge is now being constructed. Nearly the entire distance from the city to the bridge the grading has been done, and in a thoroughly excellent manner. The bridge is being rapidly pushed forward, the piers being nearly done. The bridge proper will be of wrought iron 1,400 feet in length, with approaches of 1,000 feet additional. It will be entirely completed by the first of October next. From Beaver to Youngstown, the terminus of the road, the progress is more than satisfactory. The road is graded, 12 miles of track are laid, and work is progressing at the rate of 1½ miles a day. The track will be completed from Youngstown to Beaver Falls by July 1, and entirely completed by Nov. 1. When completed it will be 64 miles in length. It will have 41 bridges, all of wrought iron, with approaches of the same material. The financial condition of the road is excellent."

**Portland & Ogdensburg, Vermont Divison.**—The bondholders' committee, consisting of Messrs. Louis Fitzgerald, George E. B. Jackson, Charles W. Hassler, Henry D. Hyde, John J. McCook, Wm. H. Rhawn and Wm. S. Shurtleff, has issued a circular, in which they give the following statement of indebtedness, compiled with much difficulty:

| | |
|---|---|
| First-mortgage bonds | $2,300,000.00 |
| Preferred bonds | 420,000.00 |
| Coupons claimed by Fairbanks & Co | 233,982.00 |
| Land damages, pay-rolls, supplies and working expenses | 204,261.56 |
| Unadjusted claims | 54,993.07 |
| General indebtedness | 92,896.78 |
| Fairbanks & Co., financial agents | 631,128.43 |
| Total | $3,937,261.84 |

The committee intimate that the managers of the road were unwilling or unable to give information. The earnings of the road for six years have been:

| | Earnings. | Expenses. | Net or deficit. | |
|---|---|---|---|---|
| 1872 | $53,141.90 | $66,483.24 | Def. | $13,341.34 |
| 1873 | 83,343.08 | 77,822.34 | Net. | 5,520.74 |
| 1874 | 81,914.92 | 81,307.90 | Net. | 607.02 |
| 1875 | 80,680.28 | 79,712.62 | Net. | 787.66 |
| 1876 | 104,108.11 | 105,808.90 | Def. | 1,700.79 |
| 1877 | 112,735.05 | 117,310.51 | Def. | 4,575.46 |
| Six years | $515,923.34 | $528,445.51 | Def. | $12,522.17 |

Most of the time the road has been in an unfinished condition, and it has never been properly equipped, but this is certainly not an encouraging statement for a road with a debt of nearly $4,000,000. The committee had much trouble in reconciling the conflicting interests, but finally agreed upon a compromise plan, which is substantially as follows:

The committee to be constituted trustees to sue out a foreclosure, either by foreclosure and sale or by a strict foreclosure, as allowed by Vermont law. In either case a new company to be formed, which shall issue $1,250,000 new 6 per cent. bonds, and such amount of 6 per cent. preferred and of common stock as may be necessary. The bonds to be distributed as follows: To holders of preference bonds, 62½ per cent. of the amount of their holdings; to holders of first-mortgage bonds who did not assent to the preference mortgage, 51 per cent., and to those who did assent, 41 per cent. of their present bonds. All bondholders to receive preferred stock for the balance of their present bonds and interest, except that when bonds were hypothecated, not sold, the amount of the loan shall be taken, instead of amount of bonds. Preferred stock to be issued also for other lien claims. Common stock to be issued for all unsecured claims. The agreement to become binding when signed by holders of a majority of all the bonds, and bonds are then to be deposited with the Union Trust Company, of New York. All parties signing the agreement to pay, when required, an assessment of not more than 1 per cent. on their bonds or claims, to defray expenses. Interest on the new bonds for three years to be funded in interest-bearing certificates.

The committee urge parties in interest to join in this plan as the only method of saving anything at all from the wreck, and preventing a long receivership under the present suits.

**Quincy, Missouri & Pacific.**—The extension of this road is now graded from Kirksville, Mo., westward 15 miles, with the exception of the bridge and crossing at the Chariton River. Track is being laid, with two miles of iron on hand and 12 miles more ordered.

**Rochester & State Line.**—The stations on this new road, with the distances from Rochester, N. Y., are as follows: Scottsvale, 11 miles; Garbuttsville, 14; Mumford, 17; Le Roy, 25; Pavilion Centre, 30; Pavilion, 32; Pearl Creek, 35; Wyoming, 38; Warsaw, 43; Rock Glen, 48; East Gainesville, 50; Gainesville, 54; Bliss Station, 62; Eagle Village, 66; Centreville, 71; Farmersville, 75; Machias, 83; Ellicottsville, 97; Salamanca, 108. Its connections are, at Rochester with the New York Central; at Le Roy with the Attica Branch and at Warsaw and Gainesville with the Buffalo Division of the Erie; at Machias with the Buffalo, New York & Philadelphia, and at Salamanca with the Atlantic & Great Western and the Western Division of the Erie. There are car hoists at Salamanca, and it is reported that some 60 car loads of oil are received there daily from the Atlantic & Great Western.

**St. Cloud, Grantsburg & Ashland.**—This company has filed articles of incorporation in Wisconsin, for the purpose of constructing and operating a narrow-gauge railroad from a point on the St. Croix River, in township 37 or 38, north, of range 20, west, in the county of Burnett; thence in an easterly direction by the way of Grantsburg in said county, to a point of intersection with the North Wisconsin Railroad in said county, being a distance of 50 miles, and

wholly within Burnett County. The capital stock is to be $250,000.

**St. Paul & Pacific.**—The United States Circuit Court has granted the order asked for some weeks since, authorizing the Receiver to issue $500,000 in debentures for the purpose of completing the St. Vincent Extension to Pembina; also the Branch Line from Melrose to Fergus Falls.

**St. Paul & Sioux City.**—It is stated that this company has offered to build a branch from its road at South Bend, Minn., southward to Blue Earth City, about 40 miles, provided the towns on the line will give $73,000 in 7 per cent. bonds, the road to be finished in two years.

The company's statement for the four months ending April 30 is as follows:

| | |
|---|---|
| Freight | $129,347.80 |
| Passengers | 42,170.78 |
| Express, mail, etc | 8,256.42 |
| Total earnings ($1,474 per mile) | $179,775.06 |
| Working expenses (62.82 per cent.) | 113,081.62 |
| Net earnings ($547 per mile) | $66,693.44 |
| Rents received | 473.33 |
| Total | $67,166.77 |
| Taxes and insurance | $6,581.24 |
| Interest | 2,862.18 |
| Dividends on preferred stock | 36,401.09 |
| | 45,844.51 |
| Surplus | $21,322.26 |

As compared with the same period in 1877, there was an increase of $50,731.36, or 39.3 per cent., in gross, and of $40,945.23, or 154.6 per cent., in net earnings.

The Land Department reports for the four months sales of 43,010 acres for $298,290.98, an average of $6.94 per acre. Of this $182,245.69 was paid in land stock, $94,716.06 in contract notes and $21,329.23 in cash. On April 30 there were 611,879 acres unsold, and the company held $427,503.96 in contract notes. The amount of land stock outstanding was $1,910,360.76.

**Saginaw Valley & St. Louis.**—This company is having a survey made of an extension from St. Louis, Mich., westward to a junction with the Detroit, Lansing & Northern near Stanton. The distance is about 25 miles.

**Sioux City & St. Paul.**—This company's statement for the four months ending April 30, is as follows:

| | |
|---|---|
| Freight | $77,925.65 |
| Passengers | 28,458.09 |
| Express, mail, etc | 9,720.32 |
| Total ($785 per mile | $116,104.08 |
| Expenses (71.34 per cent.) | 82,754.64 |
| Net earnings ($225 per mile) | $33,349.44 |
| Rents received | 440.00 |
| Total | $33,789.44 |
| Rents, taxes and insurance | $12,496.00 |
| Interest and sinking fund | 15,036.01 |
| | 27,532.01 |
| Surplus | $6,257.43 |

Interest includes only that paid on equipment bonds and floating debt. Compared with 1877, there is an increase of $42,928.83, or 58.7 per cent., in gross, and of $23,515.83, or 240 per cent., in net earnings.

The Land Department reports for the four months sales of 29,509.83 acres for $160,687.59, an average of $6.12 per acre. Receipts were $83,539.90 in bonds, $45,409.67 in notes and $56,688.06 in cash. There are now $1,885,444.41 land bonds outstanding, to offset which the company has $89,967.74 in land contract notes and 381,298 acres of land unsold.

The Worthington & Sioux Falls Division report for the four months is as follows:

| | |
|---|---|
| Gross earnings ($637 per mile) | $26,738.81 |
| Expenses (41.04 per cent.) | 10,959.01 |
| Net earnings ($376 per mile) | $15,779.80 |
| Rents | 120.00 |
| Total | $15,899.80 |
| Taxes and insurance | $305.78 |
| Interest on bonds | 12,800.00 |
| | 13,105.78 |
| Surplus | $2,794.02 |

For the same period in 1877 there was a deficit of $8,286.52.

**Taxing Pullman Cars.**—At a recent meeting of County Auditors in Ohio to determine the valuation of railroad property, it was decided to tax Pullman cars running in or through the State. Cars running on lines extending beyond the State will be assessed at a part of their value determined by the proportion which that part of the line in Ohio bears to the whole line. The valuation will be distributed *pro rata* to the counties through which the cars run.

**Toledo, Peoria & Warsaw.**—The Purchasing Committee gives notice that the Farmers' Loan & Trust Company, of New York, will pay on and after June 6, to the first-mortgage bondholders, a sum equal to the quarterly interest due April 1, as provided in the plan of reorganization.

**Whitewater Valley.**—The purchasers of this road at the recent foreclosure sale have organized the Whitewater Railway Company, and have filed the necessary articles of incorporation in Indiana. The road is 62 miles long, from Hagerstown, Ind., to Harrison, and is worked in connection with the Fort Wayne, Muncie & Cincinnati.

## ANNUAL REPORTS.

### Northern (New Hampshire).

This company owns a line from Concord, N. H., northwest to White River Junction, Vt., 69.5 miles, with a branch from Franklin, N. H., to Bristol, 13.5 miles, making 83 miles in all. It is equipped with 25 engines, 14 passenger and 10 mail and baggage cars, 522 freight and 19 gravel cars. Its 33d annual report covers the year ending March 31, 1878.

The general account is as follows:

| | | |
|---|---|---|
| Stock ($36,969 per mile) | | $3,068,400.00 |
| Bond due April 1, 1874 | | 100.00 |
| Bills payable, unclaimed dividends | | 205,888.26 |
| Income | | 59,422.96 |
| Contingent fund | | 507,330.87 |
| June dividend | | 74,932.50 |
| Total ($47,194 per mile) | | $3,916,074.59 |
| Construction ($36,969 per mile) | $3,068,400.00 | |
| Materials and fuel | 121,546.40 | |
| Company's stock owned, 711 shares, cost | 37,708.34 | |
| Cash, balances, bills receivable | 434,174.13 | |
| Concord & Claremont R. R. | 254,245.72 | |
| | | 3,916,074.59 |

There are no changes of importance from the previous year.

The traffic for the year was as follows:

| Train Mileage. | 1877-78. | 1876-77. | Inc. or Dec. | P. c. |
|---|---|---|---|---|
| Passenger | 190,213 | 190,218 | D. 5 | .... |
| Freight | 259,237 | 243,608 | I. 15,629 | 6.4 |
| Service | 2,292 | 4,706 | D. 2,415 | 51.4 |
| Total | 451,742 | 438,533 | I. 13,209 | 3.0 |
| Passengers carried | 136,903 | 154,664 | D. 17,761 | 11.5 |
| Passenger mileage | 5,158,786 | 5,766,165 | D. 607,379 | 10.5 |
| Tons freight carried | 399,879 | 323,513 | I. 76,366 | 23.6 |
| Tonnage mileage | 25,323,409 | 20,031,812 | I. 5,291,597 | 26.4 |
| Average train load: | | | | |
| Passengers, No | 27.12 | 30.31 | D. 3.10 | 10.5 |
| Freight, tons | 97.68 | 82.23 | I. 15.45 | 18.8 |

This traffic last year was equivalent to 85 passengers and 418 tons of freight carried each way daily over the whole length of road. The earnings for the year were as follows:

| | 1877-78. | 1876-77. | Inc. or Dec. | P. c. |
|---|---|---|---|---|
| Passengers | $153,359.14 | $162,709.35 | D. $9,350.21 | 5.7 |
| Freight | 286,641.39 | 267,506.63 | I. 19,134.76 | 7.2 |
| Exp'ss, mail & rents | 24,030.82 | 28,087.18 | D. 4,056.36 | 14.4 |
| Total | $464,031.35 | $458,303.16 | I. $5,728.19 | 1.2 |
| Expenses | 346,891.54 | 354,887.58 | D. 7,996.04 | 2.3 |
| Net earnings | $117,139.81 | $103,415.58 | I. 13,724.23 | 13.3 |
| Gross earn. per mile | 5,590.74 | 5,521.72 | I. 69.02 | 1.2 |
| Net " " " | 1,411.32 | 1,245.97 | I. 165.35 | 13.3 |
| Per cent. of exps | 74.76 | 77.44 | D. 2.68 | 3.5 |

Included in expenses are $27,837.98 State tax, and $35,650.50 for new rail account. The income account is as follows:

| | |
|---|---|
| Balance from last report | $37,012.86 |
| Net earnings | 117,139.81 |
| Balance of interest account | 55,135.29 |
| Total | $209,287.96 |
| Dividends, 5 per cent | 149,865.00 |
| Balance of income account | $59,422.96 |

A gain of $22,410.10 during the year. Renewals included 705 tons of iron and 503 tons of steel rails, and 50,690 new ties; 3,450 tons of rails were repaired and relaid. Two engines and 11 freight cars were rebuilt.

The results of the year are considered good. New contracts have been made with the upper roads, avoiding the contingent liabilities imposed by the old agreements. New contracts on favorable terms have also been made with the roads running south and east from Concord.

The approaching completion of the Peterboro & Hillsboro road will probably increase the revenue from the company's interest in the Concord & Claremont, and increased revenue may be expected from that in the Sullivan road. Aid has been given to the Manchester & Keene project, in view of the benefits to be derived from its construction.

### Kentucky Central.

This company owns a line from Covington, Ky., opposite Cincinnati, southward to Lexington, 99 miles; it controls and works the Maysville & Lexington, Northern Division, from Paris Junction northeast to Maysville, 49 miles, the accounts of this line being kept separately. The Kentucky Central was formerly the property of two companies, the Covington & Lexington, from Covington to Paris, and the Maysville & Lexington, Southern Division, from Paris to Lexington. The following statements for the year ending April 30, 1877, are from the reports submitted at the recent annual meeting

The general account is as follows:

| | | |
|---|---|---|
| Stock ($50,505 per mile) | | $5,000,000.00 |
| Bonds ($10,556 per mile) | | 1,045,000.00 |
| Accounts and balances | | 23,223.38 |
| Profit and loss | | 115,732.15 |
| Total ($62,464 per mile) | | 6,183,955.53 |
| Construction accounts | $5,245,000.00 | |
| Maysville & Lexington, Southern Division | 802,656.30 | |
| Total road ($61,087 per mile) | $6,047,656.30 | |
| Cash, materials and balances | 136,200.23 | |
| | | 6,183,955.53 |

Of the stock $500,000 is preferred and $4,500,000 common stock, the amount having been fixed by the compromise which closed the once apparently endless suit between the Covington & Lexington Company and the Bowler heirs. In pursuance of this compromise 15 shares of preferred and 73 of common stock were issued during the year. The suit attacking the compromise is still pending in the Kentucky Court of Aappeals. The sinking fund now amounts to $48,000.

The company now owns all but 140 shares of the Maysville & Lexington, Southern Division, thus substantially completing the purchase of that road.

The earnings for the year were as follows :

| | |
|---|---|
| Passengers | $197,688.90 |
| Freight | 416,417.89 |
| Express and mails | 32,603.03 |
| Miscellaneous | 1,632.62 |
| Total ($6,548.91 per mile) | $648,342.42 |
| Expenses (61.95 per cent.) | 401,648.29 |
| Net earnings ($2,491.86 per mile) | $246,694.13 |
| Coupons on bonds | 73,150.00 |
| Net balance | $173,544.13 |
| Add balance from previous year | 156,631.52 |
| Total | $330,175.65 |
| Dividends and sinking fund payment | 214,443.50 |
| Balance at close of year | $115,732.15 |

The gross earnings for the year showed a decrease of $58,133.18, or 8.2 per cent., to meet which the closest possible economy was used in working the road.

Since July, 1877, the Cincinnati Southern has competed for business from Lexington and has diverted the freight traffic south of that point. An additional loss came from the general depression of business, but it is hoped that the large crops promised this year will increase the local business so as to make up for any loss from competition.

The Maysville & Lexington Railroad, Northern Division, earned $92,034.73, or $1,878.26 per mile, during the year. The earnings of the Kentucky Central on business from this line were $43,344.95. The Maysville & Lexington, Northern Division, has been reorganized under a new special charter by the owners and bondholders.

The city of Covington has given the company authority to extend its tracks to the Ohio River and surveys for this extension are now being made.

Surveys have been made of the proposed extension from Lexington to London and a resurvey of the route from Richmond to Paris, and an elaborate report prepared. The board, however, is not prepared to make any recommendation as to the building of the extension at present.

### International & Great Northern.

This company, formed in 1873 by the consolidation of the Houston & Great Northern and the International, owns a line from Houston, Texas, north to Palestine, and thence northeast to Longview, 236 miles; a line from Palestine southwest to Austin, 181 miles; branches from Phelps to Huntsville, 8 miles; from Troupe to Mineola, 44½ miles, and from Houston to Columbia, 49½ miles, making 519 miles in all. All these lines were operated for the whole of the year ending Dec. 31, 1877, but for 1876 the average was 459 miles.

The equipment consists of 40 engines; 23 passenger and 11 baggage, mail and express cars, and 704 freight cars.

The general balance sheet was as follows, Dec. 31:

| | | |
|---|---|---|
| Stock ($10,597 per mile) | | $5,500,000 |
| Bonds ($23,713 per mile) | | 12,307,000 |
| Funded coupons | | 2,787,620 |
| Bills payable, etc | | 881,499 |
| Total ($41,380 per mile) | | $21,476,119 |
| Road and equipment ($35,529 per mile) | $18,469,759 | |
| Stock and bonds | 1,275,745 | |
| Other assets | 274,750 | |
| Materials, cash, etc | 131,662 | |
| Profit and loss | 1,324,203 | |
| | | 21,476,119 |

The bonds consist of $7,348,000 first, $2,907,000 second or consolidated, and $2,052,000 convertible bonds. In 1875 the bondholders consented to fund their coupons. The deferred coupons as they accrue are funded in ten-year certificates bearing 7 per cent. gold interest, payable semi-annually, April and October, and ranking in preference of all other interest. The property was placed in the hands of a receiver April 1, 1878.

The traffic of the road was as follows:

| Train mileage. | 1877. | 1876. | Inc. or Dec. | P. c. |
|---|---|---|---|---|
| Passenger | 303,828 | 213,258 | I. 90,570 | 42.5 |
| Freight | 513,591 | 441,191 | I. 72,400 | 16.4 |
| Total | 817,419 | 654,449 | I. 162,970 | 24.9 |
| Passengers carried | 127,986 | 111,127 | I. 16,859 | 15.2 |
| Passenger mileage | 9,008,250 | 7,883,200 | I. 1,125,050 | 14.3 |
| Tons freight carried | 221,944 | 201,249 | I. 20,695 | 10.3 |
| Tonnage mileage | 35,909,691 | 30,017,844 | I. 5,891,847 | 19.6 |
| Average train load: | | | | |
| Passengers, No | 29.65 | 36.97 | D. 7.32 | 19.8 |
| Freight, tons | 69.92 | 68.04 | I. 1.88 | 2.8 |

The earnings for the year were as follows:

| | 1877. | 1876. | Inc. or Dec. | P. c. |
|---|---|---|---|---|
| Passengers | $347,866 | $280,531 | I. $58,335 | 20.1 |
| Freight | 1,130,989 | 1,007,801 | I. 123,188 | 12.2 |
| Mail and express | 64,149 | 54,472 | I. 9,677 | 17.8 |
| Miscellaneous | 17,450 | 102,192 | D. 84,741 | 82.8 |
| Total | $1,560,455 | $1,453,996 | I. $106,459 | 7.3 |
| Expenses | 1,094,207 | 862,124 | I. 232,083 | 26.9 |
| Net earnings | $466,248 | $591,872 | D. $125,624 | 21.2 |
| Gross earn. per mile | 2,987 | 3,168 | D. 181 | 5.7 |
| Net " " " | 898 | 1,289 | D. 391 | 30.3 |
| Per cent. of expenses | 69.95 | 59.29 | I. 10.66 | 18.0 |

No statement of the disposition of net earnings is given. The figures indicate a slight increase in passenger rates, and a decrease in freight rates. No explanation is given of the great decrease in miscellaneous receipts. The increase in expenses is due chiefly to the renewals made on sections of the road built a few years ago, upon which the rails and ties required renewal for the first time.

### Cumberland Valley.

This company owns a line from Harrisburg, Pa., southwest to Williamsport, Md., 82 miles; it leases and chiefly owns the Martinsburg & Potomac, which extends its road to Martinsburg, W. Va., 12 miles; the Southern Pennsylvania, a branch to Richmond with a spur to Mercersburg, 21.4 miles in all, and the Dillsburg & Mechanicsburg, 7.7 miles. The earnings of these leased lines are reported separately. The 43d annual report is for the year ending Sept. 30, 1877.

The general account is as follows:

| | | |
|---|---|---|
| Stock ($21,681 per mile) | | $1,777,850.00 |
| Bonds ($4,296 per mile) | | 352,300.00 |
| Dividends and interest | | 59,008.45 |
| Balance | | 560,470.87 |
| Total ($33,532 per mile) | | $2,749,629.32 |
| Road and equipment ($23,018 per mile) | $1,887,465.95 | |
| Cash, materials and accounts | 317,327.53 | |
| Contingent fund | 544,835.84 | |
| | | 2,749,629.32 |

The contingent fund has been reduced by a re-valuation of the assets; it is chiefly invested in securities of the leased lines.

The traffic for the year was as follows:

| Train Mileage. | 1876-77. | 1875-76. | Inc. or Dec. | P. c. |
|---|---|---|---|---|
| Passenger | 166,154 | 173,633 | D. 7,479 | 4.3 |
| Freight | 123,312 | 117,583 | I. 5,729 | 4.9 |
| Total | 289,466 | 291,216 | D. 1,750 | 0.6 |
| Passengers carried | 349,131 | 377,397 | D. 28,266 | 7.5 |
| Tons freight carried | 319,896 | 336,542 | D. 16,646 | 4.9 |
| Tonnage mileage | 11,062,944 | | | |
| Receipts per train mile | $1.7315 | | | |
| Net " " " | 0.9053 | | | |

The earnings for the year were as follows:

| | 1876-77. | 1875-76. | Inc. or Dec. | P. c. |
|---|---|---|---|---|
| Freight | $321,075.33 | $313,215.83 | I. $7,859.50 | 2.5 |
| Passengers | 165,287.86 | 190,180.87 | D. 24,893.01 | 13.1 |
| Express and mail | 14,838.75 | 14,794.30 | I. 44.45 | 0.3 |
| Miscellaneous | 18,649.43 | 29,802.65 | D. 11,153.22 | 37.4 |
| Total | $519,851.37 | $547,993.65 | D. $28,142.28 | 5.1 |
| Expenses | 239,174.15 | 249,892.46 | D. 10,718.31 | 4.3 |
| Net earnings | $280,677.22 | $298,101.19 | D. $17,423.97 | 5.8 |
| Gross earnings per mile | 6,339.65 | 6,682.85 | D. 343.20 | 5.1 |
| Net earn. per mile | 3,422.89 | 3,635.38 | D. 212.49 | 5.8 |
| Per cent. of exps | 46.01 | 45.60 | I. 0.41 | 0.9 |

The income account (condensed) is as follows:

| | | |
|---|---|---|
| Cash, Sept. 30, 1876 | | $177,332.90 |
| Accounts | | 62,707.54 |
| Net earnings | | 280,677.22 |
| Total | | $520,717.66 |
| Dividends (10 per cent.) | $178,477.25 | |
| Coupons | 26,551.50 | |
| Taxes | 26,424.14 | |
| Trustees of contingent fund | 43,610.28 | |
| Increase in materials on hand | 23,103.04 | |
| | | 298,166.21 |
| Balance, Sept. 30, 1877 | | $222,551.45 |

The item of taxes includes payment of some arrears of internal revenue tax. During the year 1,006 tons of steel rails and 23,481 new ties were laid; there are now 38 miles of the road laid with steel. Some additions were made to the equipment of the repair shops. The iron ore business decreased, but there was an improvement in local traffic.

The results from the leased lines were as follows:

| | South Penn. | Mart. & Pot. | Dills & Mech. |
|---|---|---|---|
| Train mileage | 16,097 | 23,574 | 11,173 |
| Gross earnings | $16,490.27 | $11,160.11 | $19,324.31 |
| Expenses | 15,918.28 | 10,651.16 | 10,092.15 |
| Net earnings | $571.99 | $508.05 | $9,232.16 |
| Gross earn. per mile | 770.57 | 930.01 | 2,509.65 |
| Net " " " | 26.73 | 42.41 | 1,198.98 |
| Per cent. of expenses | 96.50 | 95.40 | 52.22 |

The company had to buy in the South Mountain Iron road under foreclosure, and to reorganize it. Arrangements are being made for its transfer to the parties who bought the iron property of the same company.